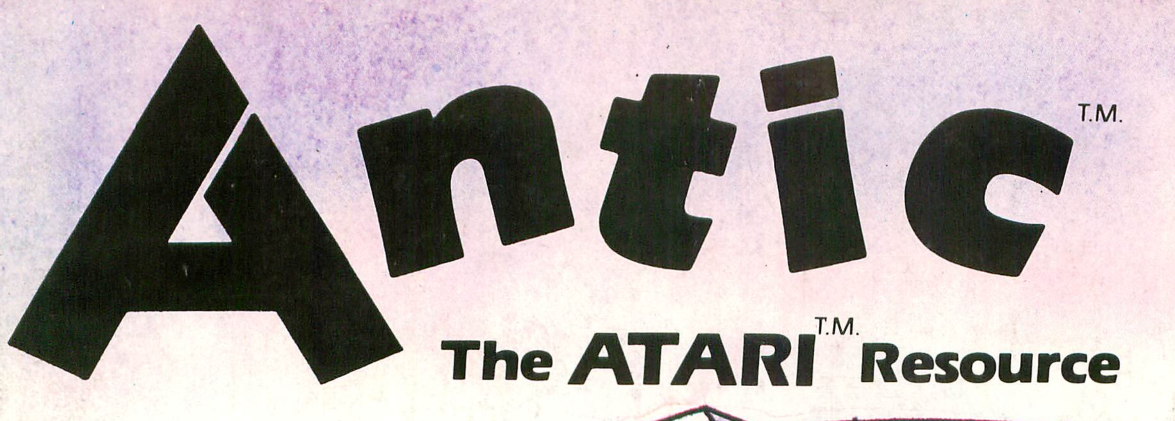


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ATARI 830

COMMUNICATIONS

Communications Software
On-Line Data Bases
Speech Synthesis
Modems

ANTIC
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BASIC

I have some books that show, I think, programs in Microsoft BASIC. I've tried to list them, but can't. I gather ATARI BASIC handled strings much differently. How can I translate from Microsoft?

I hear that PET BASIC is very similar to ATARI BASIC. Could you do some articles showing us beginners just what changes must be done to translate other BASICS so they will run on ATARI machines?

Dick Phillips
Auburn, WA

CHICKEN GAME

I really enjoyed Chicken (issue #1). It's the best action game I've ever seen written in pure BASIC. Would you do an article on using assembly language with BASIC in a future issue?

Eddie Niiya
Alameda, CA

The Chicken program alone makes the price of ANTIC worthwhile. We saw it running at the Family Computer Center in Berkeley, Michigan, and my son wouldn't let me rest until I found a copy of the magazine.

Robert Lambeck
Southgate, MI

I am new to this computer world, and am having trouble with the Chicken program. It runs to "intializing," then posts an error message 8 at line 40. I'm using an ATARI 400 with 32K and a BASIC cartridge. What's my problem?

Tom Miller
Northridge, CA

The Chicken program runs as listed in issue #1. The majority of errors stem from mistyping DATA statements. Look for transposition errors (214 instead of 241). Another common error is substituting a period(.) for a comma(,). We will be providing a program to help you find your typing errors, expect it in issue #3. ANTIC ED

ERRATA

Several readers pointed out an error in our review of LJK's "Letter Perfect" word processor. It does have selective Search and Replace in versions 2.0 and up. ANTIC ED

FORTH

I think your magazine is great. I especially like the Forth Factory, because most FORTH programs previously written use no graphics or sound, so I really had no motivation to sit down and learn the language on my ATARI. Now I think FORTH may even set me to writing some fast, sophisticated games.

Denman Hyett
Los Angeles, CA

KIDS CORNER

I enjoyed the first issue of ANTIC considerably, and typed in the (Kid's Korner) program. I found it amusing, but do believe that a person's name deserves even more respect. I composed the following BASIC program, and hope your readers like it.

Jonathan D. Youngwood

```
10 DIM NAME$(10)
20 PRINT "INPUT NAME.";
25 INPUT NAME$
30 GRAPHICS 18:SETCOLOR 0,RND(0)*
   15,RND(0)*10
40 POSITION RND(0)*10,RND(0)*11:?
   #6; NAME$;
50 SOUND 0,RND(0)*150,10,8:FOR I=1
   TO 7:NEXT I
60 GOTO 30
```

MONEY PROBLEMS

I got my ATARI 800 last Christmas, and use it mostly for word processing with Letter Perfect, and with other canned software. I find the ATARI Personal Finance Program is difficult to work with, in a single disk system, and "bombs" whenever you attempt to run data accumulated over more than two months. It displays "no recoverable system error." Now what?

Bob Spahr
San Jose, CA

MONITOR KIT?

Please avoid being too "simple." The ATARI is rapidly generating a group of "middle" programmers who need help expanding their systems. For example, I'm especially interested in: printers, interfaces and cables; converting a TV into a monitor (kit?); using ATARI PASCAL with only one disk drive.

Richard Root
APO, N.Y.

August issue will feature printers. We begin to cover PASCAL this time, see p. 33.
ANTIC ED

RADIO LINK

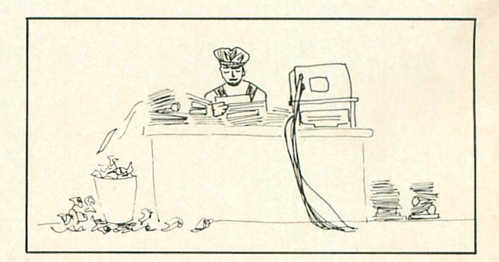
I am an amateur radio operator, AA5R. I am now using a home made modem and a variation of the baudot terminal emulator program (from the ATARI 850 Interface Manual) to receive radio-teletype messages from around the world. This has the excitement of telephone interfacing, but with no telephone bill!

There have been few articles published related to the use of the ATARI in the radio hobby. Can you cover it in some future issue?

James Howard
Austin, TX

We can if you'll write it. ANTIC ED

EDITORIAL

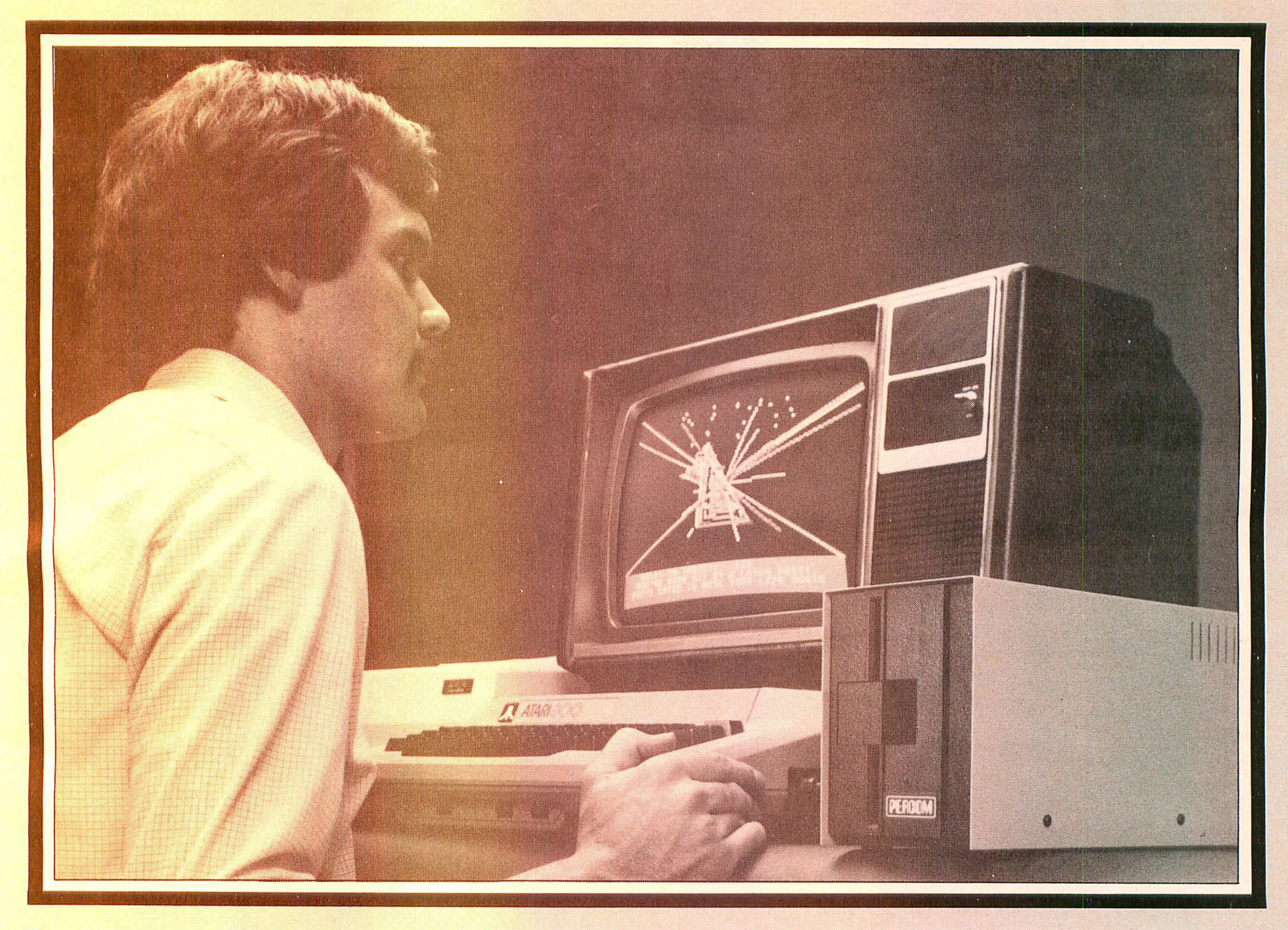


We thank those of you who let us know your first impressions of ANTIC. Some responses appear here, in our first I/O Board, what some other magazines call their "letters to the editor" page. I/O is computer jargon for Input/Output.

We read all of the letters that came in, and reproduced some representative examples. We invite all of you, beginners or advanced, to continue to let us know how we have helped (or hindered!) your use of the ATARI.

There are two other things we hope you will do. First, if you contact any of our advertisers, tell them you saw their ad in ANTIC. Second, if your computer store does not yet carry ANTIC, ask them to do so. We distribute nationwide.

—ANTIC ED



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Minimum system requirements — are an Atari 800 computer with 24-Kbytes of RAM and compatible video display system; Atari's disk-operating system (ver 2.OS) and owner's manual; and, for add-on drives (if used) an optional disk drives interconnecting cable available from Percom.

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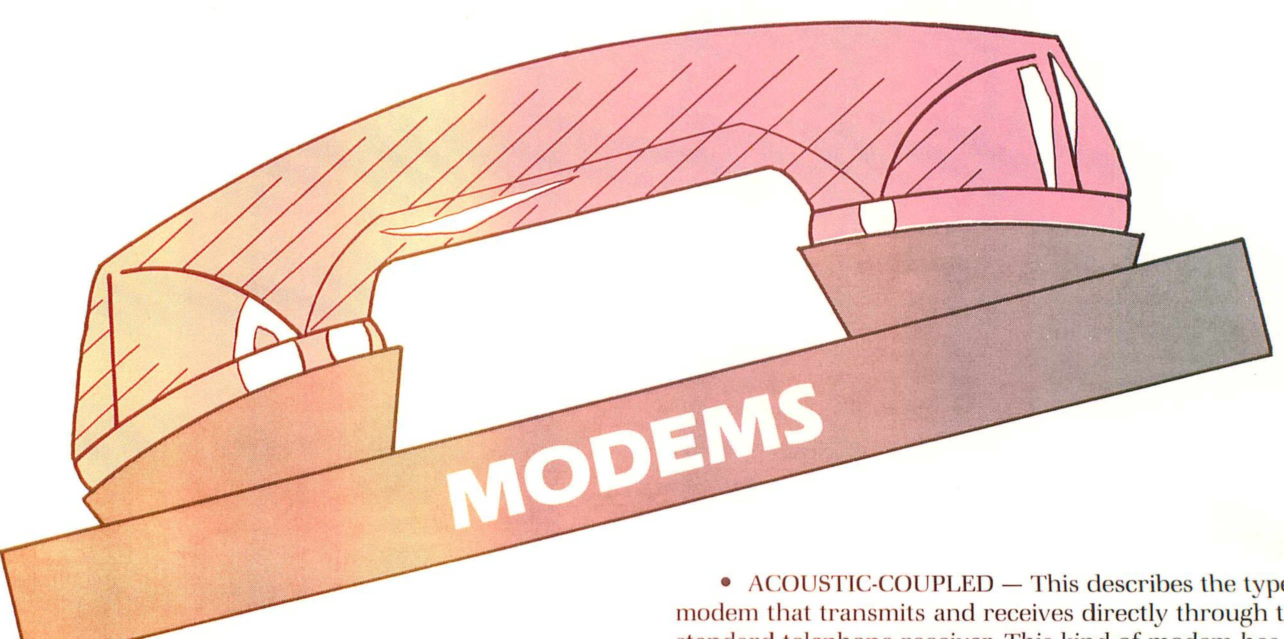
With Graphic Master you'll master more of the visual arts. You can apply special effects such as rotating or skewing images. It employs windows of color that work like a paint brush. Choose between 8 differently sized brushes to underlay or overlay color or combine images on screen to be saved on the diskette and used with other programs later. Graphic Master is compatible with Atari (48K) and retails for $39.95.

And rounding out Datasoft's graphic design program is Color Print. Original compositions will emerge in B&W, 2, 3 or 4-color high resolution tones from an Epson® MX-80, as if rolling hot off the press. Color Print is applicable to the Atari (40K) and sells for $39.95.

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by Jon Loveless

Did you ever think about what a computer really is? Take the ATARI for example. With 48K bytes of memory it can store about the same amount of text as a 15 page document. An ATARI diskette can store about 40 more pages. You can think of your display screen as a "window" through which you can seen this information, about one-quarter page at a time.

What's the point? Well, the time is here when, for the price of a cheap suit, you can expand your computer's access to millions of pages of memory, instead of just 40 or so.

We are talking about the MODEM. Let's de-mystify the modem, explore what it is, what it does, and then look at a few modems available for the ATARI.

TERMINOLOGY

Here are some terms you will find in the world of modems:

• MODEM — The word derives from "modulate-demodulate." A modem is a hardware device that translates an incoming sound signal (frequency) into a binary code that your computer will understand. (Computers do not understand sounds). The modem also works the other way around. It will translate an outgoing, computer-generated binary code into frequencies that can be transmitted over circuits used by the telephone company.

• BAUD — This term describes the rate at which data is transmitted. The telephone company has established 300 baud as a standard rate of data transmission for phone lines.

This equals 30 characters per second or approximately 350 words per minute. This is about as fast as most people can read. There is also a 1200 baud standard rate available on the phone system, at a premium price. Watch for this price to fall over the next few years.

• ACOUSTIC-COUPLED — This describes the type of modem that transmits and receives directly through the standard telephone receiver. This kind of modem has two foam "cups" into which the earpiece and the mouthpiece of the receiver are placed. The cups channel the sound, audible as a high-pitched whine, to and from the phone system, and muffle extraneous noise.

• DIRECT-CONNECT — This is the newer breed of modem. It can connect directly to your telephone wall jack or plug into your telephone with a "Y" *adapter. Out*side sound interference and clumsy manipulation of the receiver are eliminated.

• ANSWER-ORIGINATE — These terms describe which modem is calling and which modem is answering. There must be a modem on each end, but they do not have to be the same brand. Either modem can do either job, but not at the same time.

MODEMS

By now, you may be interested in buying a modem, and wondering what features are important. Here are some things you should be aware of.

Acoustically-coupled modems, the *"ear-muff" type*, were the first on the market, and are still the cheapest. They have definite drawbacks. Stray sounds in the vicinity of the modem can and do leak past the muffs and can affect data transmission. Also, using the acoustical modem is awkward, since the correct end of the phone receiver must be inserted in the correct end of the modem. This sounds minor, but the error is easily and frequently made.

Still, acoustic modems do work, are inexpensive, and may meet your needs.

Prices for direct-connect modems seem to be dropping, and the higher degree of reliabiltiy for them makes it difficult to recommend anything else. If you think you would be even a semi-serious "on-liner," you should think in terms of a direct-connect, plug-in modem. Your data will be cleaner, and the benefits of uploading and downloading data over networks, with the new information utilities (see separate article, this issue), or with other individuals, will repay the extra investment.

continued on page 9

Hayes Stack™

Microcomputer Component Systems

At Hayes, we don't believe in second best. Or planned obsolescence. We believe in taking the state of the art to the limit. Our new Smartmodem, for example, is the most sophisticated 300-baud originate/answer modem you can buy. And yet, it is perhaps the easiest-to-use modem ever.

RS-232C Compatible. Smartmodem lets any RS-232C compatible computer or terminal communicate by phone with other computers and time-sharing systems located *anywhere in North America*. You get full and half-duplex operation with both Touch-Tone* *and* pulse dialing.

Auto-Answer/Dial/Repeat. Smartmodem can answer the phone, dial a number, receive and transmit data, and then hang up the phone—automatically! If desired, Smartmodem will even repeat the last command. You can depend on Smartmodem for completely unattended operation.

Completely Programmable. Smartmodem can be controlled using *any* programming language. Over 30 different commands can be written into your programs or entered directly from your keyboard.

Smartmodem also includes several switch-selectable features that let you tailor performance to your exact needs. You can "set it and forget it" for the ultimate in convenience.

Built-in Audio Monitor. Thanks to an internal speaker, you can actually listen to your connection being made. You'll know immediately if the line is busy or if you reached a wrong number—*and you don't even need a phone!*

Status at a Glance. Seven LED's indicate Smartmodem's current operating mode: auto-answer, carrier detect, off hook, receive data, send data, terminal ready and modem ready. You're never left in the dark!

Direct-Connect Design. Smartmodem is FCC registered for direct connection to any modular phone jack—there's no acoustic coupler to cause signal loss and distortion.

Smartmodem, Smart Buy. Professional quality features. Versatile performance. A full two-year limited warranty. A suggested retail price of only $279.

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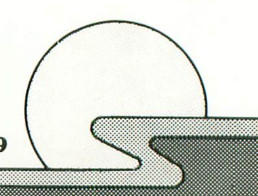
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Some modems have "status indicators." When the modem is in use it is often important to know what the status of your connection is. Is the modem "ready?" With a direct-connect modem, is the simulated "receiver" on the hook or off the hook? Has there been an accidental disconnect? Is the other end answering? The more information provided by the modem's status indicators, the better.

Some modems have "autodial/autoanswer." You can dial a phone number from your ATARI keyboard! Admittedly, this is a luxury, but if you use a modem a lot, it is a nice feature to have. Autodial allows you to store telephone numbers in your software program, and have the modem do your dialing for you. This eliminates the need for a telephone near the computer, as long as you have a phone cable long enough to reach your telephone jack.

Autoanswer is only needed for the serious application of data communications such as operating a bulletin board service, or otherwise responding to the incoming call of another computer. Think of the possibilities, though! You can call your own computer from any remote terminal, or even from a phone booth with one of the miniature modem-terminals recently announced.

Other features to look for include:

- compatibility with the Bell 103 Standard;
- full-duplex and half-duplex (in case you only want to send or receive);
- 300 baud rate, 1200 baud optional;
- RS-232 plug compatibility for ATARI 850 interface connection;
- proper connecting cables!

CABLES

A word about cables is in order. Modems must be connected to your other equipment, and to the telephone line. You would think that an expensive item like a modem would come with the appropriate cables. Not always so, and the price difference between a more expensive unit with cables and a less expensive one without, may be misleading (some cables cost $50!). Also, some modems are designed to hook up more simply, eliminating some cable requirements. Before you buy, determine your complete system requirement, and compare the price for all pieces. You will want to include software costs, too, (see separate article, this issue).

All modems, once the proper connections have been made, will perform their primary function of data communications, so the bottom line in any decision should be — quality, price, and extra features. You will probably find your use of a modem will be greater than you now expect, so be open to the more capable units.

Any modem can work with the ATARI, if properly connected, but some have been built specifically with the ATARI in mind. We will discuss the principal ones here.

ATARI 830 MODEM ($199.00)

The ATARI Modem, sold by ATARI, is a "Novation 'CAT'" modem in ATARI dress. It is a standard acoustically-coupled modem with only very basic features. It is fine for a beginning user, or someone with limited needs. Since it is marketed as an ATARI product, it comes with all required cables. It also needs the ATARI 850 Interface, which some modems do not, so if you don't have the Interface you should seriously consider the Microconnection modem (see below), or others that bypass the Interface.

The ATARI 830 is a plug-in-and-go product with good documentation. You will need software with this, as with all modems, and might well consider ATARI's TELELINK cartridge ($30) for a nice, modular system. Caution! TELELINK is a very limited program, and will not allow copying to disk. It will drive the ATARI printer, but printing "on-line" is expensive. The major drawbacks with the ATARI 830 are that it is acoustic, and has limited features.

An alternative buy would be the "Novation 'CAT'" if you can find cables. Two other "Novation" modems are compatible with the ATARI. One is the D-CAT, a basic direct-connect model, and the AUTO-CAT, that has the autodial feature mentioned earlier. Although not considered in depth here, they are both good products that should be considered as in the running.

MICROCONNECTION-A ($199 to $328)

This direct-connect modem is made by the Microperipheral Corp. and comes in four versions all designed for the ATARI. This selection is very attractive to the prospective buyer.

For example, there is a buss-decoding version ($249) that allows connection without using the ATARI 850 Interface. This modem can be used with as small a system as the ATARI 400 and the 410 cassette recorder. This model has a DB-25 socket that allows connection of the ATARI printer, again without Interface. This makes the Microconnection a good candidate for a small basic system. For $79 more this model comes with autodial.

There is a plain version ($199) that does require the Interface, and for an additional $79 you can get the autodial and autoanswer features.

Caution! Microconnection's autodial uses pulse dialing (not touch tone) which cannot be used with the MCI or SPRINT long distance phone services, but you can manually dial SPRINT or MCI with this modem. If you are a heavy user of these long distance services this could be an important limitation.

Microperipheral has done a commendable job of supporting the ATARI, and their own software enhances the capability of their modem dramatically. The top of the line software, called TSMART ($79.95) incorporates autodial as well as message preparation and storage features that reduce expensive "on-line" connection time. You will appreciate this after you see your first phone bill after buying a modem.

The Microconnection is relatively simple to connect and use. It comes with extensive, if dense, documentation which includes a listing of free bulletin board services, by area code (a nice touch!). Microperipheral Corp. maintains a user service accessible through CompuServe, over which you can get updates of their software. Now that's service!

continued on page 44

DIALING FOR DATA

by Robert DeWitt

Electronic information utilities are making a big splash on the American scene as more and more people buy computers. Most computers, including the ATARIs, can "communicate" with each other using these utilities. Communication between computers has brought about an entirely new kind of business.

What's an information utility? Essentially, it is an elec tronic network that sells computerized information and services to connected customers. Just like the water utility sells water. At present this is done over telephone circuits, and soon it will also be done by TV cable.

Two such utilities are prominent now: CompuServe and The SOURCE. The American Telephone Company (Ma Bell) is expected to enter this field soon, and will certainly be a strong contender. There are other services around that connect computers but they are usually smaller, more specific, and more expensive. DIALOG, a scientific data-base, is an example.

GENERAL

CompuServe dates back to 1969 as a data-base service company for other big companies and government. It is owned by H&R Block, and is located in Columbus, Ohio. It uses DEC-10 mainframe computers and has about 20,000 subscribers. CompuServe publishes a monthly newsletter "Update," and a quarterly magazine "Today." These are free to subscribers.

The SOURCE began in 1979 specifically as a consumer-oriented information utility, although it does serve businesses too. It was bought by Reader's Digest in 1980, and is located in McLean, Virginia. It uses six PRIME-750 mainframe computers and has 15,000 subscribers. The SOURCE publishes a bimonthly magazine "Sourceworld" that is free to subscribers.

Both utilities transmit at 300 baud or 1200 baud, and charge more for the higher rate. Since 300 baud is about 300 words per minute, it is a comfortable rate for a human operator. This article refers to 300 baud service only.

TIME AVAILABILITY

Both utilities are available full time, but at higher cost during business hours (see below). The SOURCE officially closes daily from 4AM to 6AM EST for system work. This is 1AM to 3AM PST (western nightowls take note).

CompuServe claims to be up "99.4%" of the time. Both begin their evening rates at 6PM (local time), but The SOURCE initiates a still lower rate at midnight.

ACCESS

To get connected wtih each of these utilities, the user calls a telephone number, gives an ID number and password, and is "logged on." Herein lies a significant difference. The user calls the telephone number at his own expense. If the closest access number is long distance, the user pays the charge. The SOURCE is clearly superior here, providing a local (no charge) number in about 350 major areas, including Alaska, Hawaii, Puerto Rico, and Canada.

CompuServe provides free local numbers in 95 cities, and a TYMNET number in about 200 more cities for which the user pays an additional $2.00 per hour. City size is no guarantee of having a local CompuServe number.

COST

The SOURCE has a $100 registration fee that dissuades many people. CompuServe charges $20 for a "dumb" hookup, or $30 for a "smart" one that includes software. Most ATARI owners will want the dumb package and get their software elsewhere.

All time charges are figured to the nearest minute, local time. Regular time on The SOURCE is from 6PM to midnight on weekdays, and all day on weekends and holidays. This is billed at $5.75 per hour. Midnight to 7AM is $4.25/hr. CompuServe charges $5.00/hr. from 6PM to 5AM weekdays and all day on weekends and holidays.

Rates during business hours for The SOURCE are $18/hr., and for CompuServe $22.50/hr. Anyone interested in CompuServe should add any long distance or TYMNET charges that could affect comparison.

The SOURCE has a few services that cost more, for the time they are used; commodity prices and stock analysis, Compu-U-Star ordering, and Journal abstracts. These are designated as SOURCE*PLUS and cost $15/hr. in regular time, or $10/hr. after midnight. CompuServe has a few surcharges in the stock market service, and charges a flat fee for Comp-U-Star. CompuServe also adds $2.00 to your monthly bill if you do *not* use MasterCharge or VISA for payments.

NEWS

Both utilities have news services. CompuServe is more expensive, offering Associated Press and 10 complete American newspapers including the New York

continued on page 42

COMMUNICATIONS SOFTWARE

by Jon Loveless

After you purchase a modem and install it, you will soon be very aware that there is one more important purchase you need to make, software. Without a good flexible program your modem will be useless. In this article we will introduce you to six different programs designed to be used with modems. These programs vary in ease of use and capability. We will show you the trade-offs and introduce some new vocabulary which will make our discussion more understandable.

download—this refers to the physical reception of data. It can be in the form of a complete program that you are receiving from another computer, or simply data that you are saving from Compuserve, or The SOURCE. The key word is "save". So, download means to receive and save data or programs.

upload—this is just the opposite of download. Upload refers to the act of sending a specific program or text to another computer via the trusty old modem.

host computer—this is the computer that your ATARI will talk to, assuming that you make the call. If you use the "auto-answer" capability of your modem, your computer becomes the host.

translation—refers to the degree of character code incompatibility the specific software will compensate for. This inconsistency is often a problem with those characters where no real standard has been acknowledged like special control characters. Translation also refers to a program's ability to convert from one character encoding scheme to another, ASCII to EBCDIC for example.

terminal emulator—refers to a program's capacity to make your ATARI respond as if it were some other type of terminal. VT100 or ADM-3A come to mind as widely used terminals. This is usually accomplished by redefining key and control code function.

buffer—is often used to refer to a reserved portion of computer memory. This reserved area is used by terminal software to store programs which have been downloaded. These programs can be saved to disk later off-line. Programs which force you to save to disk on-line cost more money—disk is slower.

There are many other terms you will come across, but these few will give you a start. Now, let's see what you need in the way of software. It depends largely on your application. If you only want to "look" at the data available from some other computer system, your needs are simple. If you want to save that data, your needs are more complicated, and if you want to send and receive programs, communicate with a computer at your office, or perform other such sophisticated operations you need a fancier program yet.

You will find a need for several different types of programs as you proceed, so let's sort out a few programs to see what they do, and then refer to the accompanying table for a quick reference comparison:

TELELINK—This program is available on cartridge from Atari. It is an excellent beginning for the new modem user and it comes with a free subscription to CompuServe. This alone makes it worth the money. Telelink's beauty is its simplicity. Plug it into the left slot of your ATARI and "log-on" as they say. The major drawbacks are its inability to save incoming data to disk or cassette and the inability to upload and download programs. Telelink can save data to your printer but this can be costly in terms of connection costs. This is not a bad way to introduce yourself to telecomputing but you'll end up wanting more features.

DATALINK—Swifty Software's program is probably the best all around choice you can make as either a new or intermediate user of the modem. It is simple and friendly, yet very powerful. It will fulfill most of your needs including uploading/downloading, text capture, save to disk or printer, and screen review of data in memory. It allows you to prepare text before you make the phone connection, and save text after you hang up, both important features when analyzing your phone costs. Above all else, Datalink is very easy to use. Documentation is pretty scant (6 pages) which can be a handicap to the uninitiated, but is also a reflection of how easy this program is to use.

DOWNLOAD—This software by Computer Age is a great program, but has received little promotion or publicity for some reason. It is written in BASIC and machine language (where needed for speed) and offers a benefit in that it can be modified by the user. I particularly like this feature with the Hayes Smartmodem since it allows you to add a phone number menu and make full use of the power of auto-dial. In addition, it has two menus, one for parameters and another for memory

MODEM SOFTWARE QUICK-REFERENCE TABLE

NAME	TELNK	DATLK	DWNLD	CHAMN	TSMRT	T.H.E.
MANUFACTURER	(1)	(2)	(3)	(4)	(5)	(6)
MEDIA (c = cass/d = disk)	cartg	d	c/d	c/d	c/d	c/d
LEVEL OF FLEXIBILITY	low	mod	mod	high	high	high
DOCUMENTATION	good	fair	fair	excl	excl	good
MEMORY REQUIREMENT	cartg	24K	24K	24K	24K	24K
FEATURES:						
TRANSMISSION						
.upload programs	no	yes	yes	yes	yes	yes
.download programs	no	yes	yes	yes	yes	yes
.download text	yes	yes	yes	yes	yes	yes
.full duplex	yes	yes	yes	yes	yes	yes
.half duplex	yes	yes	yes	yes	yes	yes
.terminal type	1	1	(7)	4	(7)	(7)
.BAUD rates	300	300	300	(8)	(9)	(10)
.translation choice	yes	yes	yes	yes	yes	yes
SEND DATA						
.off-line prepare	no	yes	yes	yes	yes	yes
.store ID codes	no	no	no	yes	yes	yes
.preload programs	no	yes	yes	yes	yes	yes
RECEIVE DATA						
.on-line save	yes	yes	yes	yes	yes	yes
..to printer	yes	yes	yes	yes	yes	yes
..to disk	no	yes	yes	yes	yes	yes
..to cassette	no	no	yes	yes	yes	yes
.off-line save	no	yes	yes	no	yes	yes
..to printer	no	yes	yes	no	yes	yes
..to disk	no	yes	yes	no	yes	yes
..to cassette	no	no	yes	no	yes	yes
.parity options	no	no	yes	yes	yes	yes
.memory toggle	no	no	yes	no	yes	yes
.memory management	no	yes	yes	yes	yes	yes
MISCELLANEOUS						
.user modified	no	no	yes	(11)	yes	no
.phone# storage	no	no	no	no	yes	no
.format screen	mrgns	no	no	40/80	mrgns	mrgns
.redefine keys	no	no	lmtd	yes	yes	yes

(1) TELELINK
ATARI, Inc.
1272 Borregas Ave.
Sunnyvale, CA 94086
$29.95

(2) DATALINK
Swifty Software
64 Broadhollow Road
Melville, NY 11747
$39.95

(3) DOWNLOADER
Computer Age
Silver Spring, MD
$24.95

(4) CHAMELEON
APX (Atari Program Exchange)
P.O. Box 427
155 Moffett Park Drive
Sunnyvale, CA 94086
$17.95

(5) T-SMART
Microperipheral Inc.
2643A-151st Pl. N.E.
Redmond, Wa 98052
$79.95

(6) T.H.E.
BiNARY Computers
3237 Woodward Ave.
Berkley, MI 48072
$49.95

(7) Terminal type may be defined largely through flexible parameter definition, if not by name.

(8) Widest choice from 48 to 9600 BAUD.

(9) Choice of 300 or 600 BAUD.

(10) Zero to 9600 BAUD.

(11) Source code is provided for the adventurous assembly language programmer, but is sparsely commented.

management. The [OPTION] button accesses the main menu and that allows you to go to memory management as one of the options. It is not as easy to use as Datalink, but is more flexible.

CHAMELEON—by APX (Atari Program Exchange) is a powerful machine language program that lets you tailor your ATARI to a wide variety of configurations to satisfy almost any host computer requirement. The documentation is good, but the program must be used extensively in order to feel comfortable with the many commands and options. One of the unique features is the 80-column screen emulator. Using the ATARI scrolling capability you can make it think it is an 80-column computer rather than 40. I have found little practical use for this feature yet, but it sure looks nice. I wouldn't recommend this program to beginning users of modem software unless they are ready to roll up their sleeves and work with it. For the more sophisticated user this is a powerful tool. One caveat with this program is that it transfers files more slowly because it writes to disk rather than saving to a memory buffer.

T-SMART— by Microperipheral Corporation is a powerful and flexible program written expressly for their Microconnection modem. Its power rests partly in the fact that it was written with a particular modem in mind, and partly in the fact that it is reasonably simple to use for all the flexibility it has. It is completely menu driven, but a nice feature is the option to override the menu as you become familiar with the commands. It incorporates real autodial so that you can include your own list of phone numbers right in the program. Much of the program is written in BASIC allowing you to tailor it to your own needs. Finally, as with the Microconnection itself, it is well supported through a simple contact on CompuServe. I understand this even includes updates as they become available.

T.H.E.—BINARY COMPUTER SOFTWARE presents this recent addition to the communications market. It is possibly the most complex modem program available for the ATARI. As with any powerful program, this one requires study and practice to use effectively. The documentation is well done and is readily understood by the first time user. There are many possible system configurations possible using T.H.E. With all the bulletin boards being made available, each with different requirements, this flexibility is T.H.E.'s most important feature. This is the only package that will translate ASCII to EBCDIC. This feature would only be needed when communicating with an IBM system.

TAKE YOUR PICK

So you now have a bird's eye view of 6 pieces of software for your new modem. If you are like most users you will find your needs satisfied by a simple program with occasional need for more power or flexibility. For example I still use Telelink because of its simplicity. I check the electronic mail service (EMAIL) of CompuServe with Telelink and nothing could be easier. I use Datalink often because it is simple yet quite powerful. T.H.E. is a newcomer and yet I already am finding some of its features and power attractive. Finally, if I owned a Microconnection, I would certainly use T-SMART because of the powerful design interaction between software and hardware, a well-planned pair.

For a first purchase I would be hard pressed not to recommend the Datalink program because of its nice blend of power and simplicity. It will satisfy the majority of your needs, and will allow access to most common services such as CompuServe, The SOURCE, and nearly all of the bulletin boards available. The greater parameter flexibility of some of the other programs is necessary for sophisticated communications between your ATARI and non-ATARI equipment, especially if you plan to do a fair amount of program exchange.

Our goal has been to shed light on the sometimes confusing topic of data communications. We would suggest that whatever hardware and software you decide to purchase that it be checked for compatibility. A good package will make your introduction to telecommunications easy and enjoyable. It really is a thrill when you successfully transfer your first program to a friend across town.

MOVE-IT

by Jerry White

Move-It provides the ATARI programmer with the ability to move one byte of data into a range of memory locations. This assembly language routine is position independent. It is loaded into a string from data statements 250 and 260. The routine is useful for clearing sections of screen memory, Player/Missile memory, erasing a player, and clearing memory used in page flipping.

The parameters which control this routine are passed in a USR statement. The start location and the byte total to be moved are passed. There are no limitations on the total bytes which can be moved.

Interesting sounds are also generated by the BASIC routine. The soundless version moves bytes at the rate of almost a quarter of a million per second (256×960).

```
10 ; This is a position independent subroutine
20 ; found in DATA statements line numbered 250 and 260
22 ; of BASIC listing
30 ; Calling Sequence from BASIC is:
40 ; A = USR(ADR($STR),Start Addr,Count)
50 ;
60         *=  $600      ; can go anywhere
70         PLA           ; ignore arguement count
80         PLA           ; save lo-byte of dest addr
90         STA  $CC
0100       PLA           ; save hi-byte of dest addr
0110       STA  $CB
0120       PLA           ; save total to be moved
0130       STA  $CE      ; *
0140       PLA           ; save total to be moved
0150       STA  $CD      ; *
0160       LDX  $CE      ; count of bytes to move
0170       LDY  #0       ; init index
0180       LDA  #0       ; init character to be moved
0190 MOV   STA  ($CB),Y  ; move data
0200       DEY           ; decrement index
0210       BNE  MOV      ; go move next character
0220       INC  $CC      ; incr dest addr lo-byte
0230       DEX           ; decr lo-byte count to move
0240       BMI  EXIT
0250       BNE  MOV      ; go move next character
0260       LDY  $CD      ; hi-byte of count to move
0270       BNE  MOV      ; go move next character
0280 EXIT  DEC  $CC      ; decr lo-byte dest addr
0290       LDY  #0
0300       STA  ($CB),Y
0310       RTS           ; return to BASIC
0320       .END
```

```
5 GOTO 35:REM MOVEIT UTILITY/DEMO BY JERRY WHITE 3/31/82
15 REM THATS INCREDIBLE SUBROUTINE
20 FOR M=0 TO 255:Z$(19,19)=CHR$(M):Z=USR(ADR(Z$),SM,960):NE
XT M:RETURN
30 REM SM=SCREEN MEMORY C=SPEAKER
35 GRAPHICS 0:POKE 82,0:DIM Z$(42):POKE 752,1:S=PEEK(560)+PE
EK(561)*256+4:SM=PEEK(S)+PEEK(S+1)*256:C=53279
45 REM Z$=ASSEMBLER ROUTINE STRING (POSITION 19=CHARACTER TO
 MOVE)
50 REM Z=USR(ADR(Z$),START ADR,HOW MANY)
60 FOR X=1 TO 42:READ IT:Z$(X,X)=CHR$(IT):NEXT X:POKE 82,0:?
 "←";:POKE 83,39:SOUND 0,0,0,0
65 Z$(19,19)=CHR$(128):Z=USR(ADR(Z$),SM,960):POKE 710,113:PO
SITION 39,0:? CHR$(160);
75 ? "     This DEMO demonstrates an assembler ":? "     MOVE
routine called from BASIC.          "
80 ? "     Possible uses would be to move       ":? "     blank
s or special characters to an  "
85 ? "     area of screen memory, or to clear   ":? "     RAM u
sed for player missiles or          "
90 ? "     page flipping etc.                   "
95 ? "          SELECT OPTION NUMBER:           ":? "     (1)
 FAST WITH SOUND                   ":GOSUB 230
100 ? "        (2) VERY FAST WITH SOUND          ":GOSUB 230:?
 "        (3) THAT'S INCREDIBLE (SILENT)      ":GOSUB 230
110 POKE 764,255:CLOSE #1:OPEN #1,4,0,"K:":GET #1,K:CLOSE #1
```

continued on page 48

LETTER PERFECT T.M. LJK

WORD PROCESSING

ATARI 400/800 — APPLE II & II+

EASY TO USE — Letter Perfect is a single load easy to use program. It is a menu driven, character orientated processor with the user in mind. FAST machine language operation, ability to send control codes within the body of the program, mnemonics that make sense, and a full printed page of buffer space for text editing are but a few features. Screen Format allows you to preview printed text. Indented margins are allowed. Data Base Merge with **DATA PERFECT** by LJK, form letters, accounting files and mailing labels only with MAIL MERGE/UTILITY by LJK. **FEATURES** — Proportional/ Incremental spacing * Right Justification * File Merging * Block movement * Headers * Footers * Print Multiple Copies * Auto Page Numbering * Scroll forward/backward * Search and Replaces * Full cursor control * Underlining * Boldface * Superscripts * Subscripts * Auto page numbering * Insert character/line * Delete character/line * Centering * Horizontal tabs/changeable * Multifunction format line (line spacing — left margin — page width — lines/page — change fonts — top/ bot margin adjust) **MUCH MORE! $149.95**

ATARI VERSION 2.0 #2001

Uses proportional font, right justified with Atari 825/Centronics 737, 739 printers. Uses EPSON MX* Series + Graftrax/italicized font. Can mix type fonts on same page; mix boldface and enhanced font in same line with justification. Can be used with 16K Atari/400.*

"Compared to the price of many other word processors, this package is a steal. It does everything the advertisement claims and more. On top of this the software is very easy to use." **A.N.A.L.O.G. MAGAZINE**

APPLE VERSION 5.0 #1001

DOS 3.3 compatible — Use 40 or 80 column interchangeably (Smarterm — ALS; Videoterm-Videx; Full View 80 — Bit 3 Inc.; Vision 80 — Vista; Sup-R-Term — M&R Ent.) Reconfigurable at any time for different video, printer, or interface. **USE HAYES MICROMODEM II*** LCA necessary if no 80 column board, need at least 24 K of memory. Files saved as either Text or Binary. Shift key modification allowed. Data Base Merge compatible with **DATA PERFECT*** by LJK.

"For $150, Letter Perfect offers the type of software that can provide quality word processing on inexpensive micro-computer systems at a competitive price." **INFOWORLD**

DATA PERFECT T.M. LJK

APPLE & ATARI DATA BASE MANAGEMENT — introductory price **$99.95**

Complete Data Base System. User orientated for easy and fast operation. 100% Assembly language. Easy to use. You may create your own screen mask for your needs. Searches and Sorts allowed, Configurable to use with any of the 80 column boards of Letter Perfect word processing, or use 40 column Apple video. Lower case supported in 40 column video. Utility enables user to convert standard files to Data Perfect format. Complete report generation capability. **Much More!**

EDIT 6502 T.M. LJK

This is a coresident — two pass **ASSEMBLER, DIS-ASSEMBLER, TEXT EDITOR, and MACHINE LANGUAGE MONITOR.** Editing is both character and line oriented. Disassemblies create editable source files with ability to use predefined labels. Complete control with 41 commands, 5 disassembly modes, 24 monitor commands including step, trace, and read/write disk. Twenty pseudo opcodes, allows linked assemblies, software stacking (single and multiple page) plus complete printer control, i.e. paganation, titles and tab setting. User can move source, object and symbol table anywhere in memory. Feel as if you never left the environment of **BASIC.** Use any of the 80 column boards as supported by **LETTER PERFECT,** Lower Case optional with **LCG.**

LJK DISK UTILITY — APPLE $29.95

This menu driven program allows the user to manipulate a variety of different file types. Binary, Text, and Source files may be easily converted into each other. The program may be used with **APPLESOFT*, VISCALC*,** and other programs. These program files may be readily adapted for multiple use including editing with **LETTER PERFECT** word processings.

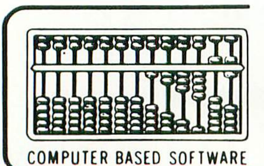
MAIL MERGE/UTILITY — $29.95 ATARI

This menu driven program combined with **LETTER PERFECT** allows user to generate form letters and print mailing labels. With the Atari, you may **CONVERT ATARI DOS FILES,** or Visicalc files compatible for editing with **LETTER PERFECT.** Utility creates Data Base files for Letter Perfect.

LOWER CASE CHARACTER GENERATOR — $24.95

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFG
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
pqrstuvwxyz{|}~
```

Lower Case Character Generator for the Rev. 7, Apple II or II+ computers. When installed, this Eprom will generate lower case characters to the video screen. Lower case characters set has two dot true descenders. Installation instruction included. Manual includes listing of software for full support and complete instructions for shift key modification. Compatible with **LETTER PERFECT.**

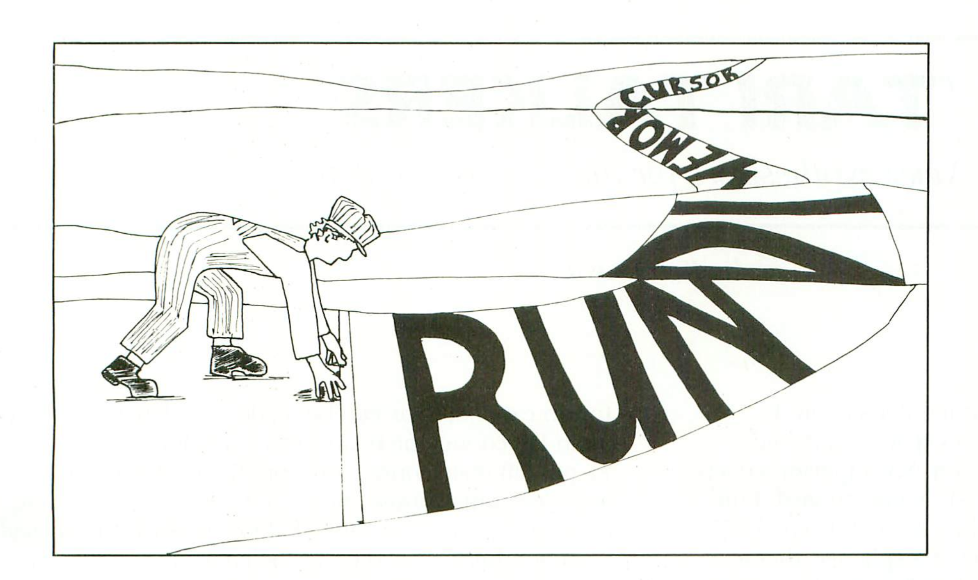


LJK TM ENTERPRISES Inc

LJK ENTERPRISES INC.
P.O. Box 10827
St. Louis, MO 63129
(314) 846-6124

DEALER INQUIRES INVITED

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SCREEN EDITING

As an ATARI owner, you will benefit from having its built-in "screen editor," one of the best available in the micro market. What's a screen editor? It's the built-in program that allows you to change words and letters after they have been keyed onto your display screen.

As you begin to program your ATARI, you will come to appreciate this powerful tool. At first, though, it may seem strange to you, and you will make mistakes until you learn its workings.

The most important thing to do, in this or any other computer function, is to read the instructions. These are in your Operators Manual, and in the BASIC Reference Manual, under "Screen Editing" and "Editing." Read these, do the exercises, and experiment. Be bold. You cannot damage your computer by making keyboard errors.

GROUND ZERO

Connect your computer as instructed, insert the BASIC cartridge, and power-up. On a color television you will see a blue screen with black borders, the word READY, and the white cursor beneath the "R". Remember, this is not an exercise in BASIC, but in screen editing. The BASIC program used is just for example.

This blue screen is BASIC Graphics Mode Zero, designed to display text. This mode divides the screen into 40 character positions across the screen and 24 lines down, i.e. a 40x24 grid yielding 960 character positions. Each position on the screen is the size of the cursor, and can be identified by its column and row number, beginning with 0.0 in the upper left corner and ending with 40.24 at the lower right. The first number, 40, indicates the column and the second number, 24, is the line number.

The content of each of the 960 positions is controlled by the Editor program, built into every ATARI. It takes one byte of memory to code the contents of each position. For the ATARI computers, this code is called the ATASCII code. You will find it in Appendix C of your ATARI BASIC Reference Manual.

The important thing to know is that you can determine and change the content of these screen positions by using your keyboard. Editing deals mostly with changing and erasing the display.

You should now be running ATARI BASIC and have the READY prompt on the screen. Type in the following program, beginning at "10 REM . . ." and be sure to include the misspelling of "capabilities." [RET] means press Return key. Begin!

```
10 REM * SCREEN EDITOR EXAMPLE *
20 PRINT "THIS IS AN EXAMPLE OF ATARI
SCREEN EDITING CAPABILITIES"
RUN
```

Notice that as you typed line 20, the line "broke" between ATARI and SCREEN. This is an example of the "logical line" continuing over two "physical" lines. This phenomenon is called "wraparound."

After the run, you should see on the screen

```
THIS IS AN EXAMPLE OF ATARI SCREEN EDI
TING CAPABILITIES

READY
```

Now we will edit this material. Generally speaking, we edit by moving the cursor to the character position we wish to change and then changing the character. The cursor rests at the left margin below the R in READY. Find the Delete Back Space key (upper right corner), which we will represent as [DEL], and press it. The cursor does not move.

How can we move the cursor? Find the [CTRL] key.

continued on page 36

'TARI TALKERS

Voice synthesizers for the Atari 400 & 800

by Ken Harms

Confidently, I slipped into the Commander's chair. I punched "Start" and a vision of deep space, scattered with stars, flashed on the viewscreen. My superior's deep voice washed through the room, "Welcome aboard, Commander. Your mission . . ." When he finished, I typed "G" for the Galaxy Map. Lt. Longri's tenor explained that a Zylon full battle patrol had entered sector A4. That fit *my* strategy! I punched the controls, and the ship leaped into hyperspace. Upon reentry, Captain Sumtra's dusky voice warned, "Zylon sector, sir." I punched for shields. "Shields," she replied.

The screen became a blur of ships, photon torpedoes, explosions. Lt. Longri calmly tracked our kills, while Captain Sumtra repeated every order smoothly. Suddenly, Damage Control's clipped, high-pitched voice screamed through the flight deck, "Shields lost!!" A Zylon fired at us. I punched hyperspace. The screen dissolved in a flash of white. Against a dark screen, the Federation's emblem appeared, the commander spoke quietly, "Posthumous . . . rank awarded . . . Garbage Scow Captain."

Now, two machines make it easy to add *voices* to your Atari programs. The "TYPE'N TALK" (TNT) from Votrax and ECHO-GP from Street Electronics *synthesize*, or create speech, from written English almost as easily as characters are printed on your screen.

Applications far beyond obvious game enhancements abound. Imagine pronouncing dictionaries or spelling programs more flexible than Speak-N-Spell. Either system could be set up easily to speak for a speech-impaired person, or to voice, letter-for-letter, or word-for-word, all data entered by, or sent to, a blind operator. My most successful program, so far, displays a four-color chart and explains it orally, with no text distracting from the visual. At least half the fun is watching a new user's face as the computer says, "Hello Mary!"

Both TNT and ECHO are efficient, small, speak an unlimited vocabulary (anything you can print), take almost no memory, and cost less than $500. Both speak with a distinct "computer voice" which the uninitiated can understand, with some concentration, but which quickly becomes "natural." It's a bit like getting used to that uncle with the funny accent.

Software is becoming available from several sources. Send me a SASE and I'll send you a couple of demo listings.

Both units require an ATARI 850 Interface and a cable. The cables are available from the manufacturers for an extra $30, or can be made, as follows. Order the 9-pin DB connector from Apex (APX-90006 $5.50), and a 25 pin DB male connector from Radio Shack ($3.50) or any electronics house. Buy a few feet of any 6-conductor (or more) conductor cable (Beldon #9421 is often used). Connect these according to the chart (Fig. 1), and you've saved $20. The TNT requires an 8-ohm speaker ($5-$10) and a mini-phone jack. The ECHO has a built-in speaker but you can add an external speaker for fidelity and volume. With an external speaker, the ECHO puts out considerably more sound than the TNT.

Getting started is simple. Set the switch to 300 baud, plug the cable into serial port 1 or 2 of the 850, boot the system, and type the following statement [The "n"s represent the IOCB (see Basic manual pg 26); the "x"s are the port number, 1 or 2]:

```
OPEN #n,8,0,"Rx":XIO 34,#n,48,0,"Rx":XIO36,#n,12,0,"Rx"
```

After that, merely issue PRINT #n commands to make the units speak what you wish. A program to input a string from the keyboard and speak it, takes no more than three lines. Both units include clear, usable manuals with lots of examples.

Although the units are similar, there are clear differences. The most important criterion to me was intelligibility. No speech synthesis device is worthwhile if you can't understand it. A frequent user will get accustomed to either of these. To check for immediate clarity, I took both units to the Lawrence Livermore Lab Science Fair, and asked visitors to listen to a list of 20 words, spelled as recommended by both companies, spoken alternatively on one, then the other, unit. Since I have used the Votrax for 6 months and find it quite clear, I expected it to win this test. However, nearly all people istening to the two for the first time found the ECHO clearly superior. The ECHO seemed to excel with words beginning with "hard sounds" such as T, P, B.

Intelligibility aside, I examined reactions to the ECHO's many unique features. Both units sound like computers, not people. But as one girl said, the ECHO sounds like a "he," the TNT like an "it." The ECHO's software-switchable pitches (at normal speed) were a popular feature. The lower voices were easier for most people to understand and several suggested creating dialogues between different personalities, each with a different voice.

The ECHO's "inflection" feature raises the tone of the last syllable before a question mark and lowers it before a period. Although only about half of the new listeners could describe this effect, it may have contributed to the ECHO's superior intelligibility.

Spoken punctuation is another ECHO plus. Normally, it speaks the punctuation commonly spoken ($,#,=). But, at the drop of a software instruction, most punctuation (comma, period, semi-colon, parenthesis, etc.) or *all* (including spaces, returns, etc.) are spoken. This could be a real boon to the sight-impaired. Both units will spell capitalized acronyms. The ECHO, however, has a letter mode which will spell out all words—very useful for a spelling program or a blind operator faced with an unintelligible word.

Both systems allow the user to create phoneme strings. This results in phrases with exceptional clarity. Frankly, since I get acceptable results with English, phoneme coding words seem like too much work. For instance, "catalogue" is coded "KA3DIL*1G"! If you decide to phoneme code, a TNT software option will send you a phoneme string as it translates from the English. You then polish it up for final phoneme codes.

The TNT's enclosure has some problems. The on/off switch is on the back panel, and worse, the unit has no "on" light. Many's the time the kids have left the TNT on all night! ECHO has a light, and the switch is right up front.

So there's the balance. Both do a good job. Intelligibility, features and price make the ECHO distinctly superior.

ECHO-GP (Serial)
Street Electronics
3152 E. La Palma Ave., Suite D
Anaheim, CA 92806
714-632-9950
List Price—$369.95

TYPE 'N TALK
Votrax
500 Stephenson Highway
Troy, MI 48084
800-521-1350
List Price—$375 + speaker

Figure 1

WIRING CHART

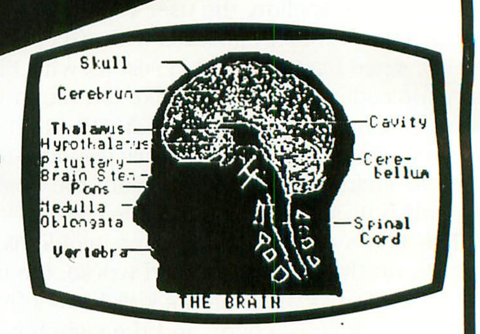
Atari 9 pin DB Male	25 Pin DB Male TNT	25 Pin DB Male ECHO
1	—	—
2	20/8	20/8
3	3	3
4	2	2
5	7	7
6	20/8	20/8
7	4	5
8	5	4
9	—	—

Versa Computing

PRESENTS



VersaWriter DRAWING TABLET



COMPLETE HARDWARE / SOFTWARE GRAPHICS SYSTEM - $299

- Hi-Res & Med-Res Draw
- Paint Brush-5 Sizes
- Point to Point / Line Draw
- Air Brush
- Color Fill-In
- Change Color Hue & Intensity
- Reverse Picture
- Scaling
- Split / Full Screen
- Save / Load / Erase
- Text Writer
- Fix X or Y Axis

Requires: Atari® 800, 32K RAM, Basic Language Cartridge, Disk Drive

GRAPHICS COMPOSER

PADDLE / JOYSTICK GRAPHICS SOFTWARE - $39.95

- Draw on Hi-Res Screens 7 or 8
- Save Pictures on Disk or Cassette
- Create Player / Missile Shapes Automatically
- Geometric Figures Program
- Add Text to Screen

Requires: Atari®800, 32K RAM, Basic Language Cartridge, Disk or Cassette

GLOBE MASTER

COMPLETE HI-RES GEOGRAPHY GAME - $29.95

- 8 Hi-Res Color Maps
- U.S.-Europe-World-Asia-Africa-Australia
- Countries-Cities-Capitals-Oceans-Rivers-Mountains, Etc.
- Several Skill Levels

Requires: Atari®800, 32K RAM, Basic Language Cartridge, Disk

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GAME PROGRAMMING

by Stan Ockers

Programming a computer is often more challenging and enjoyable than playing arcade games. This series of articles will describe useful programming techniques for would-be game programmers.

BASIC programming is often not adequate for the game designer. Movements are jerky, action is slow, and play quality suffers. Machine language routines are often the only thing needed to turn a common graphic effect into an eyecatcher. Through this series of articles I will demonstrate the usefulness of such routines. You may copy, improve and use these routines in your own game programming.

I recommend that machine language routines be put into the Vertical Blank Interrupt (VBI). This is that time when the electron beam tracing the TV image returns to the upper left of the screen ready to trace the next image. VBI occurs 60 times per second. This interval is ideal to update counters, move images, generate sounds and change colors. The ATARI operating system allows the programmer easy access to the VBI. The following game illustrates the use of VBI as well as Player/Missiles.

The horizontal screen position of a Player is controlled by one location. In our game the horizontal position of players (baseballs) is updated during VBI. The routine is linked to BASIC through Page Zero locations as follows:

00CE (206)—Horizontal Pos. player 0
00CF (207)—Horizontal Pos. player 1
00D0 (208)—Movement flag player 0
00D1 (209)--Movement flag player 1

In the VBI routine of listing 2 the first six instructions (called by A=USR(1536)) adds our VBI routine on the end of the normal operating system VBI. After this occurs our code is executed every 1/60 second. During these interrupts the movement flags are checked and the corresponding increments or decrements are made. For faster movements use double or triple increments.

P/M graphics area is placed on a 2K boundary (single line resolution), 16 pages down from the top of memory. Ball image data is just poked in the proper player area. There is no vertical movement involved. The balls disappear when their color is changed to background color.

Flags are used as switches or indicators of program state. An example is line 650 which checks the horizontal position of ball 1. If it has reached the window and hasn't before then the crash sequence at line 1000 is initiated and flag CRASH1 is set so it won't occur again. According to line 690 the main loop will continue as long as one of the balls is moving or one hasn't started moving.

After the scores are updated the program returns for another round. An easy way to clear the screen is to execute a graphics command but this disrupts Player/Missiles. To remedy this set GRACTL (53277) back to 0 and reset some of the CTIA registers as in line 540, then reinitialize P/M graphics.

Changing the text area in split-screen mode is a more appealing display. Lines 560-562 convert the text area to a graphics 2 mode and a graphics 1 mode. Note the row and column pokes in line 564. I find its best to poke the row and column every time. Row zero covers two lines because BASIC thinks the text area is in graphics 0.

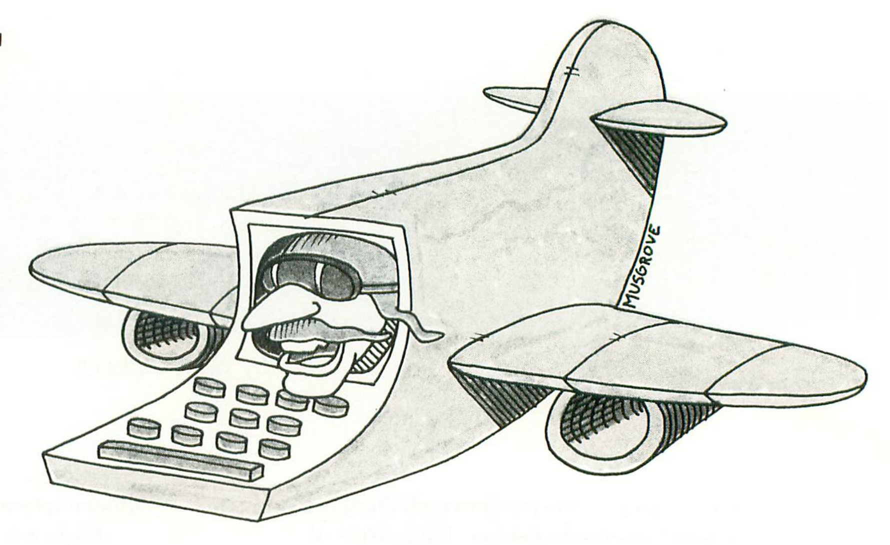
Crash-Tinkle-Tinkle was written to illustrate the simple VBI routine. The game itself is quite contrived. Two players each control a baseball as it flies towards a window. The object is to stop the baseball as close to the window as possible without breaking it. To make it more difficult the baseball disappears on its way. Only the closest ball wins points and no points are awarded for a broken window. As described the game has many faults. Baseballs don't become invisible and a glove would be a better target than a window. Better yet stopping a runaway stage coach before it plunges off a cliff would be more exciting. Additional design flaws are that the game rewards failure and the best graphics display occurs if you fail to stop the ball. Also it is not easy to see how close you are to your final goal.

Though the game is not great it does serve to illustrate some good techniques. The use of VBIs in action games is almost mandatory. Use this game as a spring board to better games and programming practices. In future columns I hope to demonstrate more elaborate routines and more exciting possibilities.

continued on page 50

LARGE TEXT

by Ken W. Harms



This series of articles will show you how to do what ATARI left out of the PILOT manuals, fancy tricks such as large letters and changing colors, useful features like breaking strings into words and using the mysterious commands in the demonstration programs.

When you run your PILOT program, three sets of instructions work together to give you the result you need. The operating system in the 400/800 provides the instructions for reading the keyboard, writing characters to the TV screen, and I/O devices, such as disk drives and printers. Additionally the PILOT cartridge contains the translation system which actually interprets your PILOT program for the ATARI hardware. These two systems working together allow the ATARI to perform the instructions you provide with the third type of instructions, the PILOT application program.

PILOT programs operate on data stored in the computer's memory or RAM (random access memory). PILOT stores each variable, constant, or instruction as a value in a unique location or address. These are like P.O. boxes. You can put messages into them and read data from them. Some addresses are used by the operating system to hold information such as the color used on the screen and what size text characters to print, large or small. PILOT lets you change the contents of these addresses to give greater graphics control.

The operating system supports fourteen different ways to display data on the screen. Those of you familiar with BASIC know eight of these modes. PILOT normally uses only two modes, Graphics 0, and Graphics 7, these are a text and a graphics mode. But you can turn on at least two of the extra modes to display large letters as eyecatching program titles.

To enable large text, we need to change values in two special addresses, 1373 and 1374, by using a special form of the Compute command:

```
C:@B1373=16
C:@B1374=1
```

This command might read as: "COMPUTE the 'byte' at address 1373 equals 16". A byte is computerese for a value in memory. The first command puts a 16 in address 1373 to tell the ATARI that you want a graphic screen with regular letters at the bottom. The value 1 at address 1374 tells the ATARI that you want it to print medium-large letters. These mode 1 letters are so large that only 20 fit on a line. Listing 1, lines 20 and 30, demonstrate these commands.

The next command you'll need is WRITE. It tells the ATARI to write data to a specific "device." These devices are identified by letters such as "D" for disk, "P" for printer, "C" for cassette and "S" for screen. Line 40 tells the ATARI to write to the screen "MODE 1 LETTERS." Of course, it will write anything you want. So, with those three simple commands, you have a dramatic opening for a program.

Change the contents of location 1374 to determine the size and number of characters per line.

1374=0	regular letters, 40 per line
1374=1	20 rows of medium letters, 20 characters per line
1374=2	10 rows of large letters 20 characters per line

The *TEST 2 module demonstrates mode 2 large letters. In both modes, try using upper, lower and inverse characters. You'll find that each prints in a different color for interesting effects.

Address 1373 is the "sub-mode" address.

1373=0	a full screen (no "text window")
1373=16	split screen (text "text window")
1373Z=32	full screen opens without erasing prior data

Listing 2 uses the 32 sub-mode to erase the text window. If you're in sub-mode 0 or 32, any text (even the READY at the end of a program) clears the screen; use a PA: command to keep the screen up. To change any mode or sub-mode, you must CLOSE:S between modes and issue both 1373 and 1374 commands in the next mode. After entering a new mode, always issue a WRITE command before a type command (T:).

Next time, we'll look at changing colors and breaking strings into letters or words.

```
10 *TEST1   [MEDIUM LETTERS MODE 1
20 C:@B1373=16 [SPLIT SCREEN
30 C:@B1374=1  [SET MODE 1
40 WRITE:S, MODE 1 LETTERS
50 PA:240   [PAUSE TO WATCH SCREEN
60 CLOSE:S [REQUIRED TO CHANGE MODES
70 J:*TEST2
80 *TEST2  [LARGE LETTERS MODE 2
90 C:@B1373=16  [SPLIT SCREEN
100 C:@B1374=2   [SET MODE 2
110 WRITE:S. THIS IS MODE 2
120 T: "T"YPED TEXT APPEARS BELOW SCREEN
130 PA:240
140 CLOSE:S
150 J:*TESTO
160 *TESTO
170 C:@B1373=0
180 C:@B1374=0
190 WRITE:S, THIS IS WRITE IN MODE 0
200 PA:100
```

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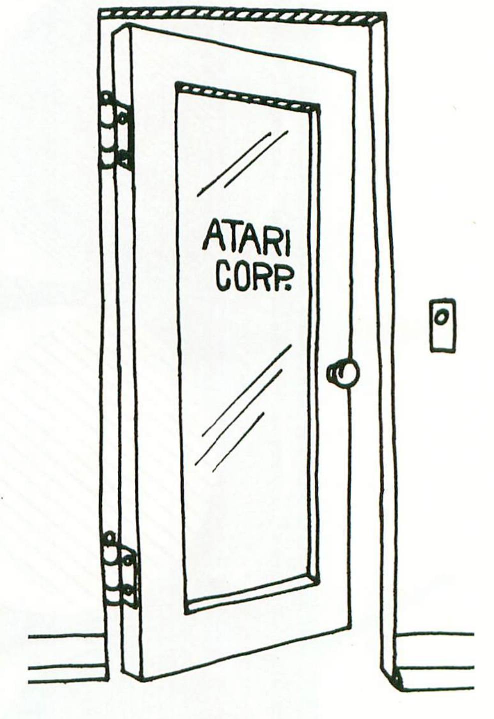
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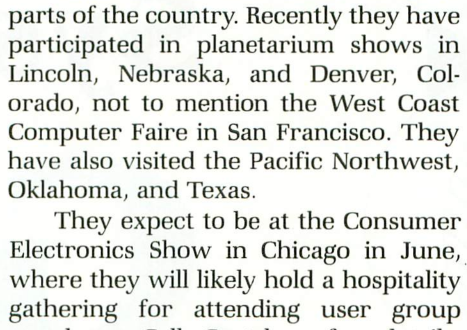
USER GROUP SUPPORT



Soon after buying an ATARI computer, a new user typically learns about the nearest user group. A user-group is a club of ATARI owners that meets periodically, swaps notes and programs, and helps members enter the world of computing. There are about 180 ATARI user groups formed throughout the world.

Obviously, these groups help Atari; and so, Atari has decided to help the groups. In January, 1981, Atari created its User Group Support Staff, in the Marketing Dept. of its Home Computer Division. It consists of four people, whose purpose is to help user groups to start and operate. A visit to this Staff begins ANTIC's adventure "Inside Atari."

The manager of the Staff is Earl Rice. He is assisted by Mark Cater, marketing specialist; Dave Menconi, software analyst; and Gretchen Nicholas, who prefers not to be called secretary and who really does all the work. They are located at 60 Plumeria, San Jose, CA 95134, where visiting user group delegations are welcome to visit, (but encouraged to give as much prior notice as possible). Atari offices are scattered all over Silicon Valley, so visitors should not expect a grand tour. Special interests will be accommodated to the extent possible.



Some of the Staff travel to other parts of the country. Recently they have participated in planetarium shows in Lincoln, Nebraska, and Denver, Colorado, not to mention the West Coast Computer Faire in San Francisco. They have also visited the Pacific Northwest, Oklahoma, and Texas.

They expect to be at the Consumer Electronics Show in Chicago in June, where they will likely hold a hospitality gathering for attending user group members. Call Gretchen for details. Their direct phone number is (408) 942-6827, and they request it be used only for user group matters. It is not a general information number. For Atari customer service, use the toll free numbers: for California (800) 672-1404; and elsewhere, (800) 538-8543.

There is another way to contact the Staff. Try CompuServe's ATARI Newsletter (Go ATR-1). This is maintained by the User Group Support Staff. Questions left in their EMail box will be answered by Mark and your question should be answered in a week or so.

Another communications avenue encouraged by the Staff is the MACE Bulletin Board. MACE is the Michigan Atari Computer Enthusiasts, a user group that has developed a bulletin board for ATARI computer systems. The Staff is helping MACE improve and distribute its bulletin board to user groups.

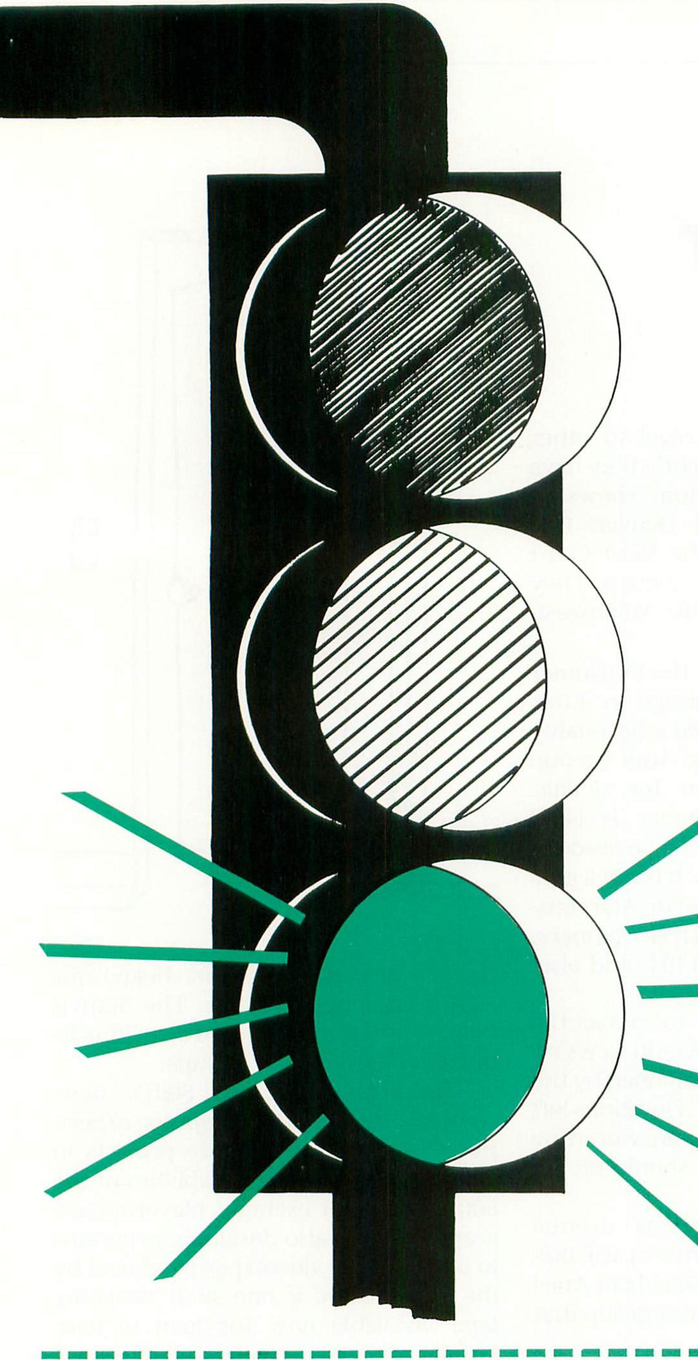
Left to right: Mark, Gretchen, and Dave.



Dave Menconi, the Staff's newcomer, is the resident computer expert. He is working on software projects to help demonstrate the capabilities of the 800 and 400, for example, player/missile graphics. He is also designing programs to use with the videotapes produced by the Staff. There is one such "teaching tape" available now for loan to user groups, and more are planned. The Staff also helps groups make their own tapes, as they have with the San Antonio and West Valley, CA groups.

When a new user group begins to form, this Staff will help with materials to guide the fledgling club, and later will provide it with technical materials for its library. It will also loan materials to groups, such as videotapes, and help them conduct activities for their community, like the planetarium shows. Those shows, by the way, projected ATARI games on the planetarium dome. Some way to play Star Raiders!

If your group has ideas or sees ways to use this Staff, they invite you to contact them. That's what they are there for.



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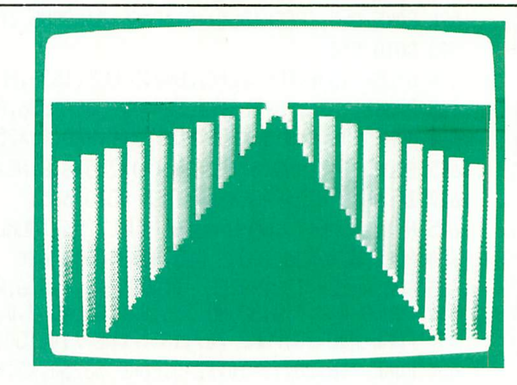
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In order to protect your home base from the dreaded Death Star, you are launched in your X-wing fighter to attack the enemy. As the simulation begins, you are flying "down the trench," the walls of the trench whipping past. The object: destroy the five radiation ports from the Death Star's main reactor. If you succeed, the reactor will overheat and self-destruct, destroying the Death Star. To hit the radiation ports, line up your cursor aiming system, using joystick (0), and fire, using the red button. The ports are oval green openings in the bottom of the trench. The Death Star has a full complement of Tie fighters for its defense. The fighters attack one by one, firing furiously. If you are hit too many times, your fighter will explode and crash. To combat the Tie fighters, you'll have to wait till the Tie fighter is in the center of the screen before you can hit it. If you don't want to type in this program, send a stamped self-address envelope and cassette with $4.00 to David Plotkin.



Submitted by:
David Plotkin and Maria Montes
5720 Alameda Avenue, Richmond, CA 92804
Day Phone: 620-3980 Eve. Phone: 236-1181
System Requirements: 32K, 1 joystick

```
2 REM *** WRITTEN FOR ANTIC THE ATARI RESOURCE
4 REM *** BY DAVE PLOTKIN RICHMOND,CA. 94804
10 GOSUB 1500
20 GOSUB 800
30 GOSUB 900:SIZEC=0:SIZEM=0:SIZEL=0:HITS=0:N=0:Y3=38:SIZEH=0:FF=1:X=121:GOTO 540
100 ST=STICK(0):IF ST<13 OR ST>14 THEN GOTO 160
105 NUML=PEEK(DL4):NUMH=PEEK(DL5)
110 NUML=NUML+20*(ST=14)-20*(ST=13):NUMH=NUMH+(NUML>255)-(NUML<0)
120 NUML=NUML+256*(NUML<0)-256*(NUML>255)
130 IF ST=13 AND NUMH-RT=PAGE*8+1 THEN GOTO 160
140 IF ST=14 AND NUMH-RT=PAGE*8+4 THEN GOTO 160
150 POKE DL4,NUML:POKE DL5,NUMH:N=N+2*(ST=13)-2*(ST=14):Y3=Y3+2*(ST=13)-2*(ST=14)
160 IF SIZEC=0 THEN GOTO 220
180 YTEMP=Y2:XX=RND(0):Y2=Y2+2*(ST=13)-2*(ST=14)+4*(XX>0.8)-4*(XX<0.12):IF Y2<20 THEN Y2=20
195 IF Y2>75 THEN Y2=75
196 FF=FF+2*(X2<112)-2*(X2>130):X2=X2+FF:POKE 53250,X2
210 D=USR(1536,PB+768+YTEMP,284):D=USR(1536,PB+768+Y2,260*(Y2>=65)+268*(Y2<65 AND Y2>43)+276*(Y2<=43)):GOTO 230
220 IF INT((50-10*B)*RND(0))=0 THEN SIZEC=1:Y2=36:D=USR(1536,PB+768+Y2,276)
230 IF SIZEM=0 THEN GOTO 290
240 D=USR(1536,PB+640+Y1,284):Y1=Y1+2*(ST=13)-2*(ST=14):SIZEM=SIZEM+1
250 IF SIZEM=4 AND (ABS(Y1-Y)>12 OR ABS(X1-X)>12) THEN SIZEM=0:GOTO 290
260 IF SIZEM<>4 THEN GOTO 280
270 SOUND 0,100,8,8:SETCOLOR 4,5,12:FOR W=1 TO 50:NEXT W:SOUND 0,0,0,0:SETCOLOR 4,0,0:HITS=HITS+1:SIZEM=0:GOTO 285
280 D=USR(1536,PB+640+Y1,324*(SIZEM=3)+332*(SIZEM=2)):GOTO 300
285 IF HITS=12 THEN GOTO 600
290 IF INT(RND(0)*(16-2*B))=0 AND SIZEC<>0 THEN Y1=Y2:X1=X2:POKE 53249,X1:SIZEM=1:D=USR(1536,PB+640+Y1,340)
300 IF SIZEL=0 THEN GOTO 350
310 IF SIZEL>1 OR SIZEC=0 OR ABS(Y2-Y0)>4 OR ABS(X2-X)>4 THEN GOTO 330
320 D=USR(1536,PB+768+Y2,348):SOUND 1,40,8,8:FOR W=1 TO 50:NEXT W:SIZEC=0
325 D=USR(1536,PB+768+Y2,284):SOUND 1,0,0,0
330 D=USR(1536,PB+512+Y0,284):SIZEL=SIZEL-1:IF SIZEL=0 THEN GOTO 350
340 Y0=70*(SIZEL=2)+50*(SIZEL=1):D=USR(1536,PB+512+Y0,308*(SIZEL=2)+316*(SIZEL=1)):GOTO 400
350 F=0:D=USR(1536,PB+512+Y,292):IF STRIG(0)=0 THEN Y0=100:SIZEL=3:D=USR(1536,PB+512+Y0,300):F=1
400 IF SIZEH=0 THEN GOTO 450
410 D=USR(1536,PB+894+Y3,284):Y3=Y3+2:IF Y3>102 THEN SIZEH=0:D=USR(1536,PB+896+Y3,284):GOTO 450
420 IF Y0=50 AND ABS(Y3-Y0)<=2 AND F=1 THEN POKE 707,82:SOUND 2,100,8,10:FOR W=1 TO 100:NEXT W:SOUND 2,0,0,0:B=B+1
430 IF B=5 THEN SOUND 3,0,0,0:GOTO 700
440 D=USR(1536,PB+896+Y3,356*(Y3-N>=75)+364*(Y3-N>46 AND Y3-N<75)+372*(Y3-N<=46)):RETURN
450 IF INT(RND(0)*(50+20*B))=0 THEN SIZEH=1:Y3=38+N:POKE 707,196:D=USR(1536,PB+896+Y3,372):RETURN
460 RETURN
540 SOUND 3,220,4,2:IF STICK(0)=15 THEN GOTO 540
550 POKE DL5,(PEEK(DL5)-24):PAGE=0:GOSUB 100
```

continued next page

```
560 POKE DL5,(PEEK(DL5)+8):PAGE=1:GOSUB 100
570 POKE DL5,(PEEK(DL5)+8):PAGE=2:GOSUB 100
580 POKE DL5,(PEEK(DL5)+8):PAGE=3:GOSUB 100
590 GOTO 550
600 D=USR(1536,PB+512+Y,284):D=USR(1536,PB+512+Y0,284):D=USR(1536,PB+640+Y1,284)
605 D=USR(1536,PB+768+Y2,284):D=USR(1536,PB+896+Y3,284):FOR W=1 TO 50
610 POKE 708,RND(0)*255:POKE 709,RND(0)*255:POKE 710,RND(0)*255:POKE 712,RND(0)*255
615 SOUND INT(RND(0)*4),RND(0)*255,8,8:NEXT W:NUML=PEEK(DL4):NUMH=PEEK(DL5)
620 IF NUMH-RT>=PAGE*8+4 THEN GOTO 635
625 NUML=NUML+20:NUMH=NUMH+(NUML>255):NUML=NUML-256*(NUML>255)
630 POKE DL4,NUML:POKE DL5,NUMH:GOTO 620
635 FOR W=120 TO 1 STEP -1:SOUND 0,100,8,W/10:NEXT W
640 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND 2,0,0,0:SOUND 3,0,0,0
645 POKE 708,13:POKE 709,135:POKE 710,130:POKE 712,0
650 POKE 706,26:Y2=10:X2=5:POKE 53250,X2:D=USR(1536,PB+768+Y2,380)
655 FOR X2=5 TO 121:POKE 53250,X2:FOR W=1 TO 40:NEXT W:NEXT X2
660 POKE 53249,120:FOR Y1=32 TO 16 STEP -4:D=USR(1536,PB+640+Y1,388):NEXT Y1
665 SOUND 0,12,12,8:FOR W=1 TO 800:NEXT W:SOUND 0,0,0,0
667 FOR Y1=32 TO 16 STEP -4:D=USR(1536,PB+640+Y1,284):NEXT Y1
670 FOR C=10 TO 100 STEP 10:POKE 706,C:SOUND 0,120-C,8,8:FOR W=1 TO 75:NEXT W:NEXT C
672 D=USR(1536,PB+768+Y2,348):POKE 706,53:FOR W=120 TO 20 STEP -0.5:SOUND 0,200,8,W/10:NEXT W:D=USR(1536,PB+768+Y2,284)
673 SOUND 0,0,0,0
675 FOR W=1 TO 500:NEXT W:POKE 53277,0:GRAPHICS 17:POSITION 1,8:? #6;"THE DEATH STAR HAS":POSITION 1,9
676 ? #6;"DESTROYED YOUR HOME":POSITION 1,10:? #6;"BASE. YOU LOST."
677 POSITION 1,11:? #6;"TO PLAY AGAIN":POSITION 1,12:? #6;"PRESS FIRE BUTTON"
680 IF STRIG(0)=1 THEN GOTO 680
685 SIZEC=0:SIZEM=0:SIZEL=0:HITS=0:N=0:B=0:Y3=38:SIZEH=0:FF=1:X=121:Y=50:GRAPHICS 5+16:NUML=0:NUMH=RT+28
690 POKE 708,138:POKE 709,135:POKE 710,130:POKE 704,98:POKE 705,22:POKE 706,50
695 POKE 707,196:POKE 559,46:POKE 53277,3:D=USR(1536,PB+512+Y,292):POKE DL4,NUML:POKE DL5,NUMH:GOTO 540
700 D=USR(1536,PB+512+Y0,284):D=USR(1536,PB+640+Y1,284):D=USR(1536,PB+768+Y2,284)
702 NUML=PEEK(DL4):NUMH=PEEK(DL5)
705 D=USR(1536,PB+896+Y3,284):FOR W=1 TO 10:IND=40*(W/2=INT(W/2))-40*(W/2<>INT(W/2))
710 NUML=NUML+IND:NUMH=NUMH+(NUML>255)-(NUML<0):NUML=NUML-255*(NUML>255)+255*(NUML<0)
715 SOUND 0,W*20,8,8:POKE DL4,NUML:POKE DL5,NUMH
720 FOR M=1 TO 100:NEXT M:NEXT W
725 POKE 708,0:POKE 709,0:POKE 710,0:POKE 53250,121:Y2=40:POKE 706,26
730 D=USR(1536,PB+768+Y2,396):FOR C=10 TO 100 STEP 10:POKE 706,C:SOUND 0,120-C,8,8
735 FOR W=1 TO 75:NEXT W:NEXT C
740 FOR M=1 TO 5
745 D=USR(1536,PB+768+Y2,348):POKE 706,53:FOR W=120 TO 30 STEP -1:SOUND 0,200,8,W/10:NEXT W:D=USR(1536,PB+768+Y2,284)
750 FOR W=1 TO 50:NEXT W:NEXT M:SOUND 0,0,0,0
755 FOR W=1 TO 400:NEXT W:POKE 53277,0:GRAPHICS 17:POSITION 1,8:? #6;"CONGRATULATIONS !!!"
760 POSITION 1,9:? #6;"YOU HAVE DESTROYED":POSITION 1,10:? #6;"THE DEATH STAR":GOTO 677
800 FOR A=1536 TO 1560:READ I:POKE A,I:NEXT A
805 DATA 104,104,133,204,104,133,203,104,133,207,104,133,206,160,0,177,206,145,203,200,192,8,208,247,96
810 FOR A=260 TO 403:READ I:POKE A,I:NEXT A
815 DATA 129,129,153,231,231,153,129,129,0,68,84,108,84,68,0,0,0,0,20,28,20,0,0,0
820 DATA 0,0,0,0,0,0,0,0,0,0,16,16,124,16,16,0,0,126,126,126,126,126,126,0,0,0,60,60,60,60,0,0
825 DATA 0,0,0,24,24,0,0,0,60,126,255,255,255,255,126,60,0,0,34,119,119,119,34,0,0,0,0,54,54,0,0,0
830 DATA 0,146,84,40,214,40,84,146
835 DATA 0,24,60,126,255,126,60,24,0,24,60,126,60,24,0,0,0,0,24,60,24,0,0,0
837 DATA 0,66,90,126,219,126,66,66,24,24,24,24,24,24,24,24,60,126,255,255,255,255,126,60
840 A=PEEK(106)-48:POKE 54279,A:PB=256*A:POKE 53256,1:POKE 53257,1:POKE 53258,1
845 POKE 53259,1
850 FOR A=PB+512 TO PB+1024:POKE A,0:NEXT A:POKE 623,1
860 X=121:X1=121:X2=121:POKE 53248,X:POKE 53249,X:POKE 53250,X:POKE 53251,120
890 RETURN
900 RT=PEEK(106):RT=RT-32:POKE 106,RT:POKE 559,0
910 FOR I=RT*256 TO (RT+32)*256:POKE I,0:NEXT I:GRAPHICS 5+16
920 DL=PEEK(560)+256*PEEK(561):DL4=DL+4:DL5=DL+5
930 POKE 88,0:POKE 89,RT+4:PAGE=0:GOSUB 1000
940 POKE 88,0:POKE 89,RT+12:PAGE=1:GOSUB 1000
```

```
950 POKE 88,0:POKE 89,RT+20:PAGE=2:GOSUB 1000
960 POKE 88,0:POKE 89,RT+28:PAGE=3:GOSUB 1000
970 NUML=0:NUMH=RT+28:POKE DL4,NUML:POKE DL5,NUMH:POKE 559,46
975 POKE 708,138:POKE 709,135:POKE 710,130:POKE 704,98:POKE 705,22:POKE 706,50:Y=50:D=USR(1536,PB+512+Y,292)
976 POKE 707,196:POKE 559,46:POKE 53277,3
980 RETURN
1000 COLOR 1:FOR Y=10 TO 47:PLOT 0,Y:DRAWTO 79,Y:NEXT Y
1010 COLOR 0:PLOT 39,10:PLOT 40,10:PLOT 39,11:PLOT 40,11
1012 COLOR 2:FOR D=1 TO 28:READ X,Y:PLOT 0,Y:DRAWTO X,Y:NEXT D
1014 DATA 31,20,30,21,29,22,28,23,28,24,27,25,26,26,25,27,24,28,24,29,23,30,22,31,21,32,20,33,20,34,19,35,18,36
1016 DATA 17,37,16,38,15,39
1020 DATA 15,40,14,41,13,42,12,43,11,44,10,45,9,46,8,47
1030 FOR D=1 TO 20:READ X,Y:PLOT X,Y:READ X,Y:DRAWTO X,Y:NEXT D
1040 DATA 38,10,38,10,41,10,41,10,33,11,38,11,41,11,46,11,29,12,38,12,41,12,50,12
1045 DATA 25,13,37,13,42,13,54,13,21,14,36,14,43,14,58,14,17,15,35,15,44,15,62,15
1050 DATA 13,16,34,16,45,16,66,16,9,17,33,17,45,17,70,17,5,18,32,18,46,18,74,18
1055 DATA 1,19,32,19,47,19,78,19
1060 FOR D=1 TO 28:READ X,Y:PLOT X,Y:DRAWTO 79,Y:NEXT D
1065 DATA 48,20,48,21,49,22,50,23,51,24,52,25,53,26,54,27,54,28,55,29,55,30,56,31
1070 DATA 57,32,58,33,59,34,60,35,61,36,62,37,63,38,63,39,64,40,65,41,66,42,67,43,67,44,68,45
1075 DATA 69,46,70,47
1076 RESTORE 1014
```

```
1080 IF PAGE<>0 THEN GOTO 1200
1090 COLOR 3:PLOT 35,11:DRAWTO 35,15:DRAWTO 44,15:
     DRAWTO 44,11
1100 PLOT 31,12:DRAWTO 31,21:DRAWTO 48,21:DRAWTO 48,12
1110 PLOT 27,13:DRAWTO 27,25:DRAWTO 52,25:DRAWTO 52,13
1120 PLOT 23,14:DRAWTO 23,31:DRAWTO 56,31:DRAWTO 56,14
1130 PLOT 19,15:DRAWTO 19,35:DRAWTO 60,35:DRAWTO 60,15
1140 PLOT 15,16:DRAWTO 15,40:DRAWTO 64,40:DRAWTO 64,16
1150 PLOT 11,17:DRAWTO 11,45:DRAWTO 68,45:DRAWTO 68,17
1160 PLOT 7,18:DRAWTO 7,47:PLOT 3,19:DRAWTO 3,47
1170 PLOT 72,18:DRAWTO 72,47:PLOT 76,19:DRAWTO 76,47
1180 RETURN
```

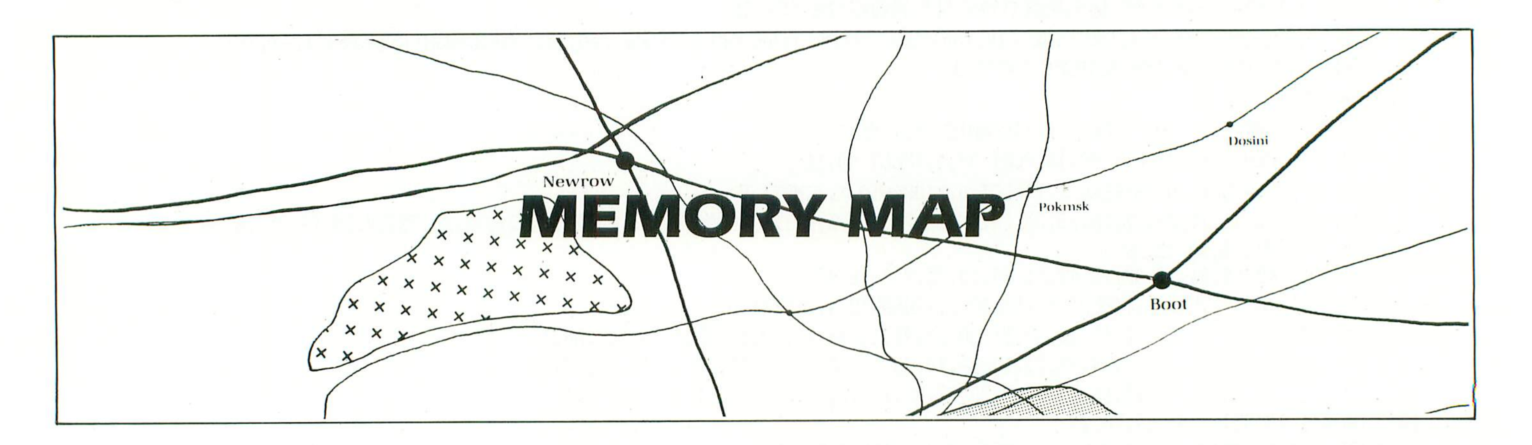
```
1200 IF PAGE<>1 THEN GOTO 1300
1210 COLOR 3:PLOT 38,10:DRAWTO 38,12:DRAWTO 41,12:
     DRAWTO 41,10
1220 PLOT 34,11:DRAWTO 34,16:DRAWTO 45,16:DRAWTO 45,11
1230 PLOT 30,12:DRAWTO 30,22:DRAWTO 49,22:DRAWTO 49,12
1240 PLOT 26,13:DRAWTO 26,26:DRAWTO 53,26:DRAWTO 53,13
1250 PLOT 22,14:DRAWTO 22,32:DRAWTO 57,32:DRAWTO 57,14
1260 PLOT 18,15:DRAWTO 18,36:DRAWTO 61,36:DRAWTO 61,15
1270 PLOT 14,16:DRAWTO 14,41:DRAWTO 65,41:DRAWTO 65,16
1275 PLOT 10,17:DRAWTO 10,46:DRAWTO 69,46:DRAWTO 69,17
1280 PLOT 6,18:DRAWTO 6,47:PLOT 2,19:DRAWTO 2,47
1285 PLOT 73,18:DRAWTO 73,47:PLOT 77,19:DRAWTO 77,47
1290 RETURN
```

```
1300 IF PAGE<>2 THEN GOTO 1400
1310 COLOR 3:PLOT 37,11:DRAWTO 37,13:DRAWTO 42,13:
     DRAWTO 42,11
1320 PLOT 33,11:DRAWTO 33,17:DRAWTO 46,17:DRAWTO 46,11
1330 PLOT 29,12:DRAWTO 29,23:DRAWTO 50,23:DRAWTO 50,12
1340 PLOT 25,13:DRAWTO 25,27:DRAWTO 54,27:DRAWTO 54,13
1350 PLOT 21,14:DRAWTO 21,33:DRAWTO 58,33:DRAWTO 58,14
1360 PLOT 17,15:DRAWTO 17,37:DRAWTO 62,37:DRAWTO 62,15
1370 PLOT 13,16:DRAWTO 13,42:DRAWTO 66,42:DRAWTO 66,16
1375 PLOT 9,17:DRAWTO 9,47:DRAWTO 70,47:DRAWTO 70,17
1380 PLOT 5,18:DRAWTO 5,47:PLOT 1,19:DRAWTO 1,47
1385 PLOT 74,18:DRAWTO 74,47:PLOT 78,19:DRAWTO 78,47
1390 RETURN
```

```
1400 COLOR 3:PLOT 36,11:DRAWTO 36,15:DRAWTO 43,15:
      DRAWTO 43,11
1410 PLOT 32,12:DRAWTO 32,19:DRAWTO 47,19:DRAWTO 47,12
1420 PLOT 28,13:DRAWTO 28,24:DRAWTO 51,24:DRAWTO 51,13
1430 PLOT 24,14:DRAWTO 24,29:DRAWTO 55,29:DRAWTO 55,14
1440 PLOT 20,15:DRAWTO 20,34:DRAWTO 59,34:DRAWTO 59,15
1450 PLOT 12,17:DRAWTO 12,43:DRAWTO 67,43:DRAWTO 67,17
1460 PLOT 16,16:DRAWTO 16,38:DRAWTO 63,38:DRAWTO 63,16
```

```
1470 PLOT 8,18:DRAWTO 8,47:PLOT 4,19:DRAWTO 4,47:PLOT 0,20:DRAWTO 0,47
1480 PLOT 71,18:DRAWTO 71,47:PLOT 75,19:DRAWTO 75,47:PLOT 79,20:DRAWTO 79,47
1490 RETURN
1500 GRAPHICS 2+16:POSITION 5,4:PRINT #6;"STAR WARS"
1510 POSITION 0,5:PRINT #6;"ATTACK ON THE DEATH":POSITION 7,6:PRINT #6;"STAR":POSITION 2,7:PRINT #6;"BY DAVID PLOTKIN"
1530 FOR W=1 TO 1500:NEXT W
1560 GRAPHICS 1+16:POSITION 2,10:PRINT #6;"THE SCREEN WILL":POSITION 2,11:PRINT #6;"CLEAR FOR ABOUT"
1570 POSITION 2,12:PRINT #6;"2 MINUTES. PLEASE   STAND BY..."
1580 FOR W=1 TO 500:NEXT W:RETURN
```

by James Capparell



The memory map we are presenting is an on-going feature of ANTIC. We intend to publish the function of all the low memory RAM locations.

The format for our description is:

12	$C	2	DOSINI	The Operating System variable called DOSINI uses 2 continguous locations starting at address 12 (decimal) or C (hexidecimal).

Page 0 continued

116	$74	2	ENDPT	Contains larger of DELTAR and DELTAC used in conjunction with ROWAC/COLAC to control plotting of line points.
118	$76	1	DELTAR	Contains absolute value of NEWROW – ROWCRS.
119	$77	2	DELTAC	Contains absolute value NEWCOL – COLCRS. These values and ROWINC and COLINC define slope of line to be drawn.
121	$79	1	ROWINC	Row increment + or –1.
122	$7A	1	COLINC	Column increment +1 or –1.
123	$7B	1	SWPFLG	Split screen cursor control.
124	$7C	1	HOLDCH	Character moved here before control and shift logic processed.
125	$7D	1	INSDAT	Temporary storage used by display handler.
126	$7E	2	COUNTR	Initially contains larger of DELTAR and DELTAC which is number of iterations to generate a line. This value decremented after every point is plotted. When = 0 then line is finished.
128	$80	2	LOMEM	This points to a 256 byte buffer used to tokenize one line of BASIC. This buffer is located at the end of the O.S.RAM.
130	$82	2	VNTP	Points to list of all variable names used in a program. Each name is stored in the order entered in ATASCII code. Maximum of 128 names.
132	$84	2	VNTD	Points to end of variable name table. Points to a zero byte when all 128 names not used.
134	$86	2	VVTP	Points to variable value table. Eight bytes allocated for each variable in name table.
136	$88	2	STMTAB	Points to statement table which contains the tokenized BASIC statements. Also the immediate mode lines.
138	$8A	2	STMCUR	The BASIC interpreter uses this pointer to access the tokens within a line of the statement table.
140	$8C	2	STARP	Points to the block containing all the string and array data. Memory is reserved and enlarged whenever a dimension statement is encountered. Strings are stored one byte (ATASCII) per character. Arrays are stored as six byte BCD (Binary Coded Decimal) per element.
142	$8E	2	RUNSTK	Points to the software run time stack. The stack maintains GOSUB and FOR/NEXT entries. The POP statement affects this stack.
144	$90	2	MEMTOP	Points to the end of the user program. The FRE function returns the value calculated by subtracting the contents of this location from the contents of HIMEM at $2E5 and $2E6. Don't confuse this MEMTOP with the O.S. variable of the same name at $2E5

End of Page 0

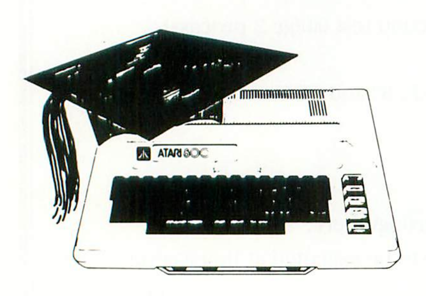
If anyone had determined the function of the other zero page locations let us know.

512 $200 [illegible]

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E	Erase Buffer
I	Input File
O	Output File
R	Receive Data
S	Send Data
T	Terminal Mode
C	Configuration Menu
D	DOS Menu

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A FIRST LOOK

by Gary and Susan Frederick

After months of waiting, the PASCAL language is available through the Atari Program Exchange. It's a bargain at less than $50, BUT the user will have to have access to two (2) disc drives to operate PASCAL on his system.

PASCAL is fast becoming a favorite language of many computer scientists. It is taught as a first language in many colleges the way FORTRAN was a few years ago. PASCAL is structured, offering ease in design and debugging. A program written in standard PASCAL, with just a few modifications, can be used on a number of different computers.

continued next page

```
type
  adr = integer;

  dlinst = record
             op : byte; (* display list instruction *)
             addrop: adr; (* address for op *)
           end; (*dlinst*)

  dlrec = record
            bl8lines : array [0..2] of byte; (* blank 8 lines *)
            lms : array [0..12] of dlinst; (* 3 byte DL instructions *)
          end; (*dlrec*)

var
  i,j : adr;
  dl : ^dlrec; (* pointer to type dlrec *)
  dladdr : absolute [$230] ^dlrec; (*address of display list pointer *)

procedure initdl; (*initialize display list*)
  var
    i : integer;

begin
  dl := dladdr; (* point to the current DL *)

  dl^.bl8lines[0] := 112; (*blank 8 scan lines*)
  dl^.bl8lines[1] := 112;
  dl^.bl8lines[2] := 112;

  for i := 0 to 11 do
    begin  (* set the op and address in modified DL *)
      dl^.lms[i].op := 71; (* load memory scan basic 2*)
      dl^.lms[i].addrop := i*256
    end; (*for*)

  dl^.lms[12].op := 65; (*jump vertical blank*)
  dl^.lms[12].addrop := dladdr;
end; (*initdl*)

begin (* main procedure *)
  initdl;
  while TRUE do
    begin
      for i := 0 to 235 do
        begin (* loop through a page *)
          for j := 0 to 11 do
            begin (* set the 12 lines addresses *)
              dl^.lms[j].addrop := (dl^.lms[j].addrop & $ff00) + i
(* add one to the address, do not change the page the address points to  *)
            end; (*for j*)
        end; (*for i*)
    end;
end.
```

Atari PASCAL is based on the International Standards Organization's (ISO) version with a few enhancements to support the Atari's unique capabilities, such as player missiles, joysticks, paddles, and sound. The PASCAL Reference and Operations manual states differences between Atari PASCAL and UCSD PASCAL. UCSD PASCAL is a popular version of the language available on a variety of computers including Apple.

As the reference manual states, Atari PASCAL is not meant for someone unfamiliar with programming or the internals of the Atari. However, we feel that those of you who have been using BASIC for some time and are familiar with your machine, could teach yourself PASCAL, with an appropriate book on the language, and a lot of patience. The reference manual is full of information but requires a lot of study to understand. (We need a *De Re Pascal*, perhaps?)

A number of different editors can be used to create your source. We have used Text Wizard and the Assembler editor from Optimized System Software to edit our programs. Remember that if your text is numbered the included files must be numbered also.

When it comes time to compile and run your program, a great deal of disk manipulation is required. The pseudo-code compiler performs several passes of error checking so initially it may seem like your program is error free but all is not clean until the final linkage is complete. Everytime a program is compiled, you will need two disc drives, one disc with your source, one compiler disc and one linker disc. The linker and compiler disc are included in the package and should be backed up before you run anything. One fault we found is the screen tells you to "Insert D1" at the end of a compile. We feel it would be clearer to say "Insert linker disc" or "Insert disc number one". Leaving the wrong disc in drive one causes PASCAL to die and you have to start over.

Some comments about Atari PASCAL: Sets use too much space. A set with two items like SCRN_TYPE is 32 bytes long. The set should occupy the largest space needed to store it in memory, in this case, one byte. Also, WRITE is slow compared to BASIC. But, you can link PASCAL to Atari's new Macro Assembler. So for the disadvantages to this version, there are quite a few advantages.

We have included an example of display lists in PASCAL here. In the next few issues we will go into detail on using Atari PASCAL. We will demonstrate some of the features of PASCAL that need examples such as calling Assembler and using the 850 Interface with a modem.

We will contribute our examples to ANTIC's Public Domain library. This will help those of you starting out and will *we hope* result in other users contributing to the Library.

If you have problems, send an example and we will help find what went wrong. Because PASCAL is an APEX program, Atari can not answer questions concerning its operation.

Program D1Demo
Our example program is the scrolling example from De Re Atari chapter 6-4 written in PASCAL. The main features of Atari PASCAL demonstrated are:

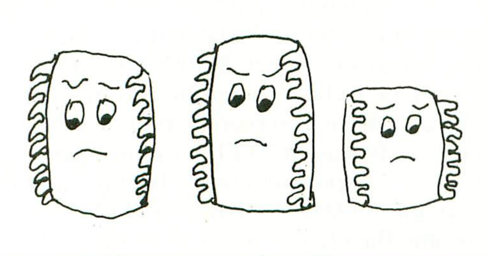
1. Using ABSOLUTE in the declaration of DLADDR to read the address of the display list.

2. Setting a pointer to the location of the data structure DL to modify the display list easily.

3. Using logical arithmetic to update an address.

Atari's implementation of PASCAL is very rich. We could have written this program many different ways, all of them equally valid. One important fact is that the screen scrolls FAST!! PASCAL programs are much faster than the equivalent BASIC program.

Our Pascal editors may be reached for questions at the following address:
3357 W. Kings Ave.
Phoenix, AZ 85023
Please send SASE with your inquiry.



WHEN THE CHIPS ARE DOWN

The new Revision B Operating System was released in January. To determine if your machine has the version B, type in this BASIC instruction.

```
PRINT PEEK(58383)
if result=56 then you have Revision A
if result=0 then you have Revision B
```

If you have difficulty loading from and saving to cassette, try using LIST "C:" and ENTER "C:" commands instead of CLOAD and CSAVE. LIST and ENTER use a slower baud rate which is often more successful. Also prior to executing a CSAVE remember to type LPRINT. This will generate an error and initialize some internal register locations. Ignore the error and procede as usual with CSAVE.

The new disk drives require more power, approximately 3 MA. The older disk drives required the same power supply as the console, 1.5MA. Look on the bottom of the transformers in the right hand column of printing to determine which is which. The more powerful, required by the disk drives, show a 31 VA. The console power supply as well as the older drives show 15 VA. Try not to mix them up, this could cause erratic speed problems with the new disk drives.

If you have some useful tips or interesting "Dos and Don'ts" send them to ANTIC c/o WHEN THE CHIPS ARE DOWN.

Press it down and hold it there. Find the "up" arrow key and press it three times. Release the [CTRL]. The cursor will move up three lines and be superimposed over the T in TING. Notice that the T appears dark blue within the field of the cursor. This condition is called "inverse video."

Press the space bar four times. The cursor moves across the letters to TING, erasing them as it passes.

To the right of the cursor is the word CAPABILITIES. Next, correct the spelling. Press and hold [CTRL], and press the right-pointing arrow key until the cursor is superimposed on the T. We want to insert the letter I. Holding the [CTRL], press the Insert key (top row, third from right).

Voila! A space opens between the L and the T. Release [CTRL] and type in the letter I. The cursor now rests over the letter T. To exit from the word without changing it, press and hold [CTRL], and press the left-pointing arrow until you have backed out of the word. Release [CTRL].

UP AND OVER

Here is a surprise for you. Press [DEL] six times. This will be enough to make the cursor back up to the line above. This is due to wraparound. It would not be possible between logical lines without using the [CTRL].

We can now repair the damage done by typing the word EDITING. When the cursor again rests between EDITING and CAPABILITIES, press and hold the [CTRL], press the down arrow key three times, release [CTRL] and finally, press return.

Let's see if we have corrected the misspelling. Type LIST and press [RET]. This command rewrites the corrected program. You should have lines 10 and 20 come up, and the error is still there. That's because the correction was made to the "run," and not to the program. This time we will fix it for good. Press and hold [CTRL]. Press the up arrow three times till the cursor is over the S in SCREEN. Press the right-pointing arrow key till the cursor is over the T in CAPABILITIES. Still holding [CTRL], press the Insert key. Pop! Release [CTRL], type I. There!

Having corrected the I, let's exit the line. Hold [CTRL], press the down arrow three times, release [CTRL], then [RET]. Type RUN and press [RET]. A new line should appear on the screen. Read your correction. WHAT! The error is still there?

That's right. This is the trickiest part of screen editing in BASIC. Remember, changes to the screen do not equal changes to the Deferred Mode program. Changes within number lines (Deferred Mode) are made permanent by pressing the return key [RET] before you leave the logical line on which the change was made.

Let's do it right this time. Hold [CTRL]. Move the cursor up until it is over the S in SCREEN. Hold the [CTRL] and press the right-arrow until the cursor is over our "I" (yes, it's still there in screen memory, but not in program memory). Release [CTRL]. This time, press return. The cursor jumps down to the beginning of the next line, above the READY. Type RUN and [RET].

Aha! This time the change has been made in the program.

GLOSSARY

BASIC—Beginners All Purpose Symbolic Instruction Code. This high level programming language was developed at Dartmouth College as an instructional tool. Your BASIC cartridge translates your instructions (program) into numbers the ATARI understands.

K—as in "48K memory." This computer jargon indicates thousands. When someone says, "32K," they are referring to approximately 32,000 memory locations. To be absolutely correct K really means 1024. 1024 is two raised to the tenth power. Therefore, 32K is 32×1024 or 32,768.

BINARY—a method of coding in which only two representations exist; yes/no, on/off, 1/0 are examples. This coding technique lends itself to computers since power is either on or off.

BIT—an abbreviation for Binary Digit. A Binary Digit can hold one of two values, 0 or 1. Contrast this with a Decimal Digit which can hold any of ten values, 0,1,2,3,4,5,6,7,8,or 9.

BYTE—This word refers to one addressable location in ATARI memory. It has commonly come to refer to eight contiguous bits. A byte is the minimum addressable quantity in memory.

EDITOR—In computer terminology this refer to a program used to insert, delete, correct, or change text. The important distinction here is that these changes can be made without the necessity of having to retype the entire line. The ATARI screen editor that most of you use with BASIC is a good example.

The BLOCK (cartridge)
Manufactured by:
PROTRONICS
17537 Chatsworth
Granada Hills, CA 91344
(213) 362-8156
Price: $99.95

The BLOCK is a cartridge copying device that will transfer most cartridge-based programs to disk. It works with the ATARI 800 only, and requires 48K RAM memory plus a disk drive. The BLOCK is itself an ATARI-style cartridge. The company identifies the need to protect one's cartridges from damage or wear-and-tear as the reason for copying cartridges. Back-up disks made with the help of The BLOCK will perform in all respects as the original cartridge, however, some cartridges may be designed so that they cannot be copied by The BLOCK. Protronics says that up to ten cartridges can be copied on one disk.

SLIME (game)
Manufactured by:
Synapse Software
820 Coventry Rd.
Kensington, CA 94707
(415) 527-7751

The Plexarian Invincibles threaten all life on Earth. These invaders hover in the sky and drop layer after layer of SLIME into the Sargasso Sea. Their intention is to raise the level of the oceans until all human life is drowned. If that happens, the SLIME-breathing Invincibles will colonize the Earth. You must stop them with meager defenses, or mankind perishes.

This new game from Synapse requires 16K RAM and a joystick, and comes on cassette or diskette. Other Synapse games are "Protector," "Chicken," and "Dodge Racer."

Six new software products from ATARI have been announced for release soon. These are: Bookkeeper, Home Filing Manager, My First Alphabet, Caverns of Mars, Pac Man and Centipede. Some of these will be on the shelves by June, including the long-awaited Pac Man in cartridge form.

FASTCHIP
(ROM replacement)
Manufactured by:
Newell Industries
3340 Nottingham Ln.
Plano, TX 75074
(214) 423-1781
Price: $39.95

This chip is a replacement for the standard ROM chip that comes inside the ATARI 10K ROM board. The purpose of this replacement is to speed up number handling. The company claims FASTCHIP triples execution speed of "floating point" routines. Other ROM functions are identical to the original ROM. FASTCHIP has a 90-day warranty.

HOCKEY (game)
Manufactured by:
Gamma Software
P.O. Box 25625
Los Angeles, CA 90025
(213) 473-7441
Price: $29.95 cassette or diskette

Real-time hockey action for two, three or four players is the purpose of this game. Joysticks move men on the ice rink who can shoot, pass, catch and block the puck. If the score is tied at the end of the five-minute "regulation" game, there is a sudden death playoff. Needs 16K RAM and a joystick for each human.

PERCOM-RFD
Double-Density Disk Drives
Manufactured by:
PERCOM Data Company, Inc.
11220 Pagemill Rd.
Dallas, TX 75243
(214) 340-7081
Prices:
$799.00 (40-track, single-head master)
$399.00 (40-track, single-head slave)

PERCOM has developed several disk drives for the ATARI computers, and these substantially increase the storage capacity of diskettes. The drives are called "double-density" but some of them can more than double standard disk capacity. Compare: The ATARI 810 Disk Drive records approximately 90 thousand bytes per diskette. The PERCOM 40-track, single-head drive doubles this by recording 256 bytes per sector rather than 128 bytes. The PERCOM 40-track, double-head drive then doubles this, to 360 thousand bytes, by recording on both sides of the disk. The 80-track, single-head drive achieves the same amount by doubling the tracks on one side of the disk, and finally, the 80-track, double-head drive records an incredible 720 thousand bytes on one diskette.

Any one of these drives comes as a "master" drive, with controller circuitry designed for the ATARI, or as a "slave" without controller. A master drive can run as many as three slaves chained behind it, each slave having capabilities equal to the master. A fully-configured PERCOM chain of 80-track, double-head drives can store nearly three million bytes of on-line data.

PERCOM drives are fully compatible with the ATARI 810 Disk Drive, and can be chained behind the 810, if desired, but a chain of four drives is the maximum. Slaves require at least one master of the same type.

FULL-VIEW 80 DISPLAY CARD
Manufactured by:
Bit3 Computer Corp.
8120 Penn Ave. South
Minneapolis, MN 55431
(612) 881-6955
Price: $349.00

FULL-VIEW is a "card" of chip-based circuitry that plugs into a RAM memory slot of the ATARi 800 to produce a screen display of 80 characters per line. This card requires a monochromatic monitor screen and will not work with a television set or color monitor. It will work with BASIC or machine language, and is now compatible with the "Letter Perfect" word processor program. The company is preparing adaptations for other ATARI programs and languages.

FULL-VIEW 80 requires 16K RAM memory, but is more useful with 48K, for which Bit3 recommends its "Memory Plus" 32K expansion board ($179.00). The "Memory Plus" board plugs into the ATARI 800, or may be installed in the ATARI 400 by a repair facility. The 400 cannot use the FULL-VIEW 80.

WORDRACE (game)
Manufactured by:
Don't Ask Computer Software
2265 Westwood Blvd.—B-150
Los Angeles, CA 90064
(213) 397-8811
Price: $24.95

WORDRACE is a vocabulary game for 1–4 players, compatible with the ATARI 400/800 if equipped with 32K RAM and a disk drive. The game is a timed-quiz on vocabulary at three levels: Beginner (children 9–14), Regular, and Challenge. Each player is presented with a word and six possible definitions, while a timer counts down from 600 points. A correct answer scores the remaining number of points. A wrong answer subtracts the remaining number of points from the player's score, and the timer continues to count down until a correct answer is made.

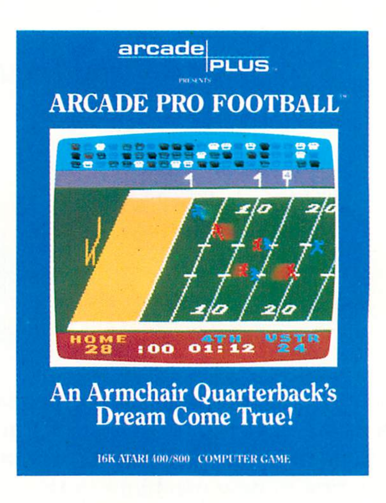
There are 2,000 words in the game's vocabulary, and the company is preparing companion disks of additional words, or that will allow owners to add their own set of words. The game is fast, competitive, and should be educational.

FAST-CHIP
(disk drive upgrade)
Manufactured by:
BiNARY Corp.
3237 Woodward Ave.
Berkley, MI 48072
(313) 548-0533
Price: $39.95

ATARI 810 Disk Drives can now be speeded up by installation of FAST-CHIP from BiNARY Corp. FAST-CHIP offers 30% faster formatting than the original 810, and 10% faster than the recently upgraded version of the drive. Installation requires only one solder connection to the drive's main electronic board. For $15 handling fee, BiNARY will install FAST-CHIP in your drive and ship it back to you.

SIX NEW GAMES
Manufactured by:
Avalon Hill Game Co.
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300
Prices: $16.00–$35.00

Six new games for ATARI computers are scheduled for release by June, 1982. These are: "Shootout at the OK Galaxy," "Computer Draw Poker," "Bomber Attack," "Roadracer/Bowling," "Knockout," and "Tank Arcade." These will be available on cassette or diskette and require varying amounts of memory. The company calls these "beer and pretzel" games with "an arcade feel." Avalon Hill specializes in war and adventure games, the most prominent of which, "Empire of the Overmind," was named Adventure Game of 1981 by Electronic Games Magazine.

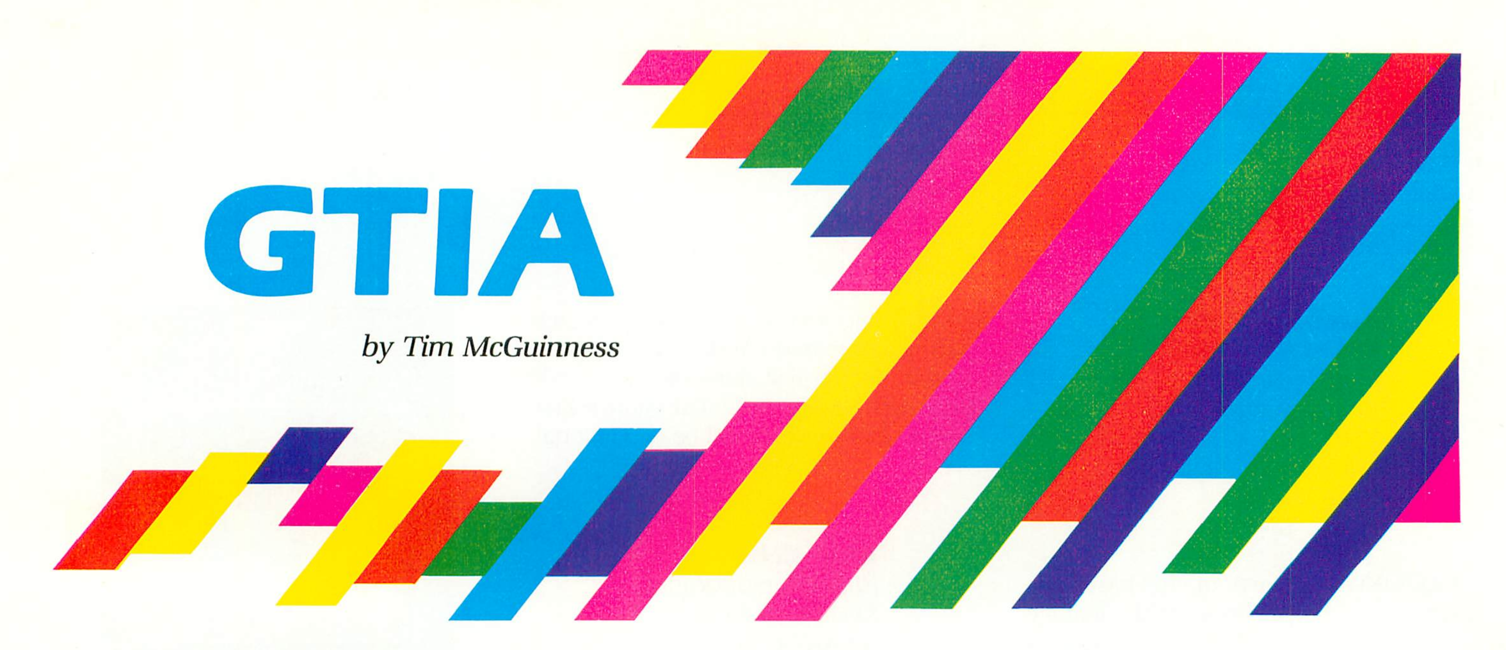


ARCADE PRO FOOTBALL (game)
Manufactured by:
Arcade Plus
3916 State Street, Suite 1C
Santa Barbara, CA 93105
(805) 687-5527
Price:
$34.95 (diskette)
$29.95 (cassette)

"Pro Football" features animated, 3-D players on a full-color, scrolling playing field. It can be played solitaire or head-to-head. The offense and defense each may choose among 25 plays during the 60-minute contest. Game action includes passing and catching, running, kicking, penalties, fumbles, interceptions, and a cheering crowd. Minimum 16K RAM required.

APPLE PANIC (game)
Manufactured by:
Broderbund Software
1938 Fourth Street
San Rafael, CA 94901
(415) 456-6424
Price: $29.95 in diskette

This arcade-style game has been a favorite among Apple users, and is now available for ATARI 400 or 800s equipped with 32K RAM and a disk drive. The player escapes from pursuing Apples, and digs holes to trap them.



GTIA

by Tim McGuinness

Every ATARI computer owner probably has heard about the new GTIA chip that replaces the CTIA chip. This upgrade item for both the 400 and 800 computers began appearing in new machines in the beginning of 1982. Some of you who bought at about that time may wonder if you have the GTIA. You can find out by running the following BASIC program.

```
10 GRAPHICS 9
20 GOTO 20
```

If you get a black screen, you have the new chip. If you get a blue screen, you have the old chip.

GTIA means Graphics Television Interface Adapter, and CTIA means Color Television Interface Adapter. GTIA continues to do all the things CTIA did, but more.

GTIA widens the gap between the ATARI computers and other home systems. It adds three more "modes" of graphic display to the nine available with the CTIA. Those modes began with GRAPHICS 0 (Test Mode) and ended with GRAPHICS 8, a high-resolution (small pixel) mode with one color of your choice in two luminances. Modes 3,5 and 7 gave you up to four colors simultaneously, with different sized pixels in each mode.

With GTIA you gain the following:

- GR.9-sixteen luminances (shades) of one of the available colors
- GR.10-nine individuals colors, each a combination of one hue and one luminance
- GR.11-sixteen colors, all at the same luminance.

The pixel with these modes is long and flat, having a 4:1 ratio, with 80 across the screen by 192 down. For comparison, a hyphen in text mode has a 7:1 ratio. The pixel (picture element) is the smallest programmable unit in a given text or graphics mode.

Using the GTIA is as simple as using the CTIA. Just use GR.9, GR.10 or GR.11 in the same way the previous modes are used (see ATARI BASIC Reference Manual and Self-Teaching Guide).

The GTIA is fully supported by the Operating System, and all the commands and utilities that run with the CTIA can be used with the GTIA, except you now have more colors available to you. Sixteen color changes can take place on a line, completely independent of the main processor. This is better than the 12 changes you could get using display list interrupts, for example. Contouring and 3-D effects are greatly enhanced. (see Listings).

GTIA programs can be used on CTIA equipped machines, but will suffer color simplification and some shifting (e.g. blue for green).

If you have the GTIA chip, you may want to type in some of the following listings. The first demonstrates GR.9. Here, the background hue is set by the SETCOLOR command. Then, the COLOR command determines the luminances for drawing on the screen by using values from 0 to 15.

```
10 GRAPHICS 9
20 SETCOLOR 4,8,0
30 FOR I=1 TO 78
40 COLOR I
50 PLOT I,I+I
60 NEXT I
70 GOTO 10
```

We will skip mode 10 for a moment to compare the similarities of mode 9 to mode 11. Here the program can use 16 different hues (colors) all at the same luminance, i.e., just the reverse of mode 9. This time the SETCOLOR command is used to provide the luminance value only, as in the line "SETCOLOR 4,0,10". The 10 is the luminance value.

```
10 GRAPHICS 11
20 SETCOLOR 4,0,10
30 FOR I=1 TO 78
40 COLOR I
50 PLOT I,I+I
60 NEXT I
70 GOTO 10
```

Note that as in all pre-GTIA graphics modes, the first binary bit of the luminance designator is not used. Therefore, only even-numbered luminance values results in distinct changes, so there are really only eight different luminances. The COLOR command this time selects the various hues by using the values from 0 through 15.

In mode 10 the computer will allow nine color registers to be used in the playfield at one time. Each register must be set to some combination of hue and luminance. You can do this in BASIC with either the SETCOLOR command, or with the POKE command. We will use POKE to put the color designators directly into decimal addresses 708-712, which hold the four playfield registers and the background register.

To set the four player/missile color registers at addresses 704-708, you *must* use POKE. The COLOR command is used to select the color register desired, and these can be from 0 through 8 only. A value over 8 will result in an unknown register being used.

A typical BASIC program for GR.10 will include: a GR.10 command; a set of POKE (or SETCOLOR and POKE) commands; and a COLOR command which selects the desired color register for drawing on the screen. This is demonstrated in the main listing with this article.

The main listing draws four cylinders in various colors and rotates them. To change the hue/luminance combinations simply change the values in lines 10 through 17.

```
5 DEG
6 GRAPHICS 10
10 POKE 706,8
11 POKE 707,32
12 POKE 708,56
13 POKE 709,80
14 POKE 710,104
15 POKE 711,128
16 POKE 712,152
17 POKE 705,176
20 FOR ANG=180 TO 360+180 STEP 6
30 X=8+8*COS(ANG)
40 Y=16+8*SIN(ANG)
50 COLOR (ANG-180)/45+1:PLOT X,Y
60 DRAWTO X,50+Y
70 COLOR 0:PLOT X,Y
90 NEXT ANG
120 FOR ANG=180 TO 360+180 STEP 6
130 X=26+8*COS(ANG)
140 Y=16+8*SIN(ANG)
150 COLOR 9-(ANG-180)/45:PLOT X,Y
160 DRAWTO X,50+Y
170 COLOR 0:PLOT X,Y
190 NEXT ANG
220 FOR ANG=180 TO 360+180 STEP 6
230 X=44+8*COS(ANG)
240 Y=16+8*SIN(ANG)
250 COLOR (ANG-180)/45+1:PLOT X,Y
260 DRAWTO X,50+Y
270 COLOR 0:PLOT X,Y
290 NEXT ANG
320 FOR ANG=180 TO 360+180 STEP 6
330 X=62+8*COS(ANG)
340 Y=16+8*SIN(ANG)
350 COLOR 9-(ANG-180)/45:PLOT X,Y
360 DRAWTO X,50+Y
370 COLOR 0:PLOT X,Y
390 NEXT ANG
410 GO TO 500
420 FOR ANG=180 TO 360+180 STEP 6
430 X=50+8*COS(ANG)
440 Y=16+8*SIN(ANG)
450 COLOR (ANG-180)/45+1:PLOT X,Y
460 DRAWTO X,50+Y
470 COLOR 0:PLOT X,Y
490 NEXT ANG
500 A=PEEK(705)
510 FOR I=705 TO 711
520 POKE I,PEEK(I+1)
530 NEXT I
540 POKE 712,A
550 GO TO 500
```

The last listing draws a light show in all 16 hues. Enjoy your ATARI.

```
5 T=0
10 GRAPHICS 11
20 XX=0
30 YY=0
40 C=0
50 X=INT(RND(0)*80)
60 Y=INT(RND(0)*192)
70 C=C+1:IF C=17 THEN C=0
80 S=INT(RND(0)*14+1)
90 COLOR C
100 PLOT XX,YY
110 DRAWTO X,Y
120 COLOR C
130 PLOT XX,YY
140 XX=X:YY=Y
150 SOUND 0,C*10,S,15:SOUND 0,0,0,0
160 T=T+1:IF T=400 THEN 5
170 GOTO 50
```

Tim McGuinness is a design engineer in corporate research and development for ATARI Inc.

Times, Washington Post, and The Los Angeles Times. The SOURCE offers United Press International and selected N.Y. Times stories and features. Indexing by key word and key-word search of news is available with The SOURCE, but not with CompuServe.

Another difference is that CompuServe purges its news daily and has no historical news files. The SOURCE purges weekly (Friday AM maintenance) so it has a whole week's news available on Thursday night. This could be an important difference for researchers or people with special news interests.

SHOPPING

Both utilities offer shopping by Comp-U-Star. This allows on-line review of about 30,000 items, plus electronic ordering for delivery to the home. The SOURCE offers "ordering" mode at SOURCE*PLUS rates, and CompuServe charges an extra membership fee of $18 per year to order. "Browsing" can be done on either utility at regular rates. Comp-U-Star itself is offered directly at $25 a year plus 25 cents per minute, so getting it as a part of a broader utility services does represent a value.

The SOURCE offers a BARTER program for world-wide exchange of goods and services, and both utilities have bulletin boards in which users may advertise. CompuServe includes classified advertising from the newspapers it carries, but this is an expensive way to read classified ads.

ON-LINE CONVERSATION

The most popular feature of either of these utilities is the on-line communication between and among users. CompuServe's version is called "CB Simulator," and it's a conversational free-for-all, with participants identified by fictitious "handles." The samples I've seen were bawdy and inane. If one perseveres, it is possible to find a party with mutual interests, and arrange a private talk. Groups can even conference on-line, and the exchange can be encrypted if all users have an encryption password.

The SOURCE offers CHAT, limited to two users who must be on-line and agree to the exchange, which is private. If you don't know anyone to chat with, you can query any user whose ID number shows up on the "on-line directory."

EMAIL

EMail is sure to become a new English word. It means electronic mail, and we will all be using it soon. Even now, users of these utilities enjoy the advantage of instantaneous message exchange, which can be printed or copied with the right equipment and software.

With either utility, messages can be EMailed to any other user of that service. The user's ID is his address, and the message will wait for him until it is picked up.

The SOURCE allows for an unlimited number of letters to collect until read. With CompuServe, your mailbox is "full" with 10 letters, and no more can be received until the mailbox is relieved of at least one letter.

With either service, the same letter can be sent to multiple addresses.

The SOURCE has an extra EMail feature called VOICEGRAM. It allows the member to call into the toll-free Customer Service number and dictate an EMail letter to any user, for a $1.25 extra fee.

CompuServe allows its memberes to use its text editor program, FILGE, on EMail.

CUSTOMER SERVICE

Both utilities maintain tollfree Customer Service numbers available 24 hours a day, and both were helpful and courteous when called. One difference that seems important when you have a problem is that The SOURCE answer automatically, puts you on hold "airline fashion' if necessary. Waiting time was three minutes, at most.

The CompuServe people either answer immediately, or you get a recording that says "all reps are busy, call back later."

STOCK MARKET INFORMATION

Both utilties provide stock market quotations, news, and analyses.

CompuServe calls its service MicroQuote, and charges five cents per quote. There is a $1 minimum fee each time that data-base is used.

The SOURCE calls its stock quotation service UNISTOX, and offers it at no extra charge. Both services cover about 30,000 issues on the major exchanges. The SOURCE also covers trading in about 20 commodities. These quotations are charged at SOURCE*PLUS rates.

BULLETIN BOARDS

Users can post their own notices on the bulletin boards of their respective utilities.

The SOURCE calls theirs POST. It is categorized by subject or interest. For example, there is an ATARI section in POST where there were about twelve notices.

The CompuServe board is called BULLET. There are three separate sections: Sale, Wanted, and Notices. Each section has a few hundred postings at a time. Each is key-worded and numbered. To find ATARI notices you must scan all three lists.

PROGRAMMING AIDS

Each of these utilities provides services for computer programmers. You can, in fact, program on-line and store data files with the utility.

CompuServe supports BASIC, Fortran, APL, Pascal, BLISS 10, MACRO, SNOBOL and AID. They call this part of the service MicroNet, and it is available at the regular rates. Each MicroNet user gets 128K of free memory, if it is accessed at least monthly.

The SOURCE supports BASIC, COBOL, Fortran, RPG II, and Assembly. It sells storage in blocks of 2,048 bytes. One to ten blocks cost fifty cents per month per block.

Both utilities allow word processing and text editing on-line. CompuServe calls their editor "FILGE." If you have only a terminal, these services make sense. If you have a computer, it is more economical to do these things off-line.

GAMES

Believe it or not, some playing on-line is a very popular part of these services, perhaps reflecting the high percentage of juvenile users. Each utility has its own

main adventure game, and other games.

CompuServe is probably more game oriented than The SOURCE. It has "Adventure (in Colossal Cave)" and two other adventure-type games, including "Scott Adams Adventure." It has Decwars and SpaceWars, which are interactive with other users, and it sponsors periodic game contests among its subscribers.

The SOURCE's primary adventure game is Blackdragon, though it also has a selection. The SOURCE has more games than CompuServe, but generally they seem more trivial.

SPECIAL INTERESTS

Each of these utilities has a vast number of special interest topics, and the variety increases all the time. It will be important to home in on your own two or three high priorities and compare specifically how these are handled by each service. CompuServe publishes a one-sheet Subject Index that you can review at any Radio Shack. The SOURCE has a pamphlet "SOURCE DIGEST" available at all Computerland stores.

Briefly, here are some special interest topics they provide about equally:

- film reviews
- airline schedules
- travel services
- electronic checkbook
- personal advisor
- legislation status
- sports information

Here are some specialties of The SOURCE:

- customized research (Information on Demand) extra fee
- Mobil Restaurant Guide
- some accredited college courses
- User Publishings (royalty to user for material accessed by others)
- employment service (wanted and offered)
- personal appointment calendar

Here are some of the specialties of CompuServe:

- SOFTEX programs for sale and on-line delivery (downloading)
- Printer Art Gallery (downloading) extra
- Future File, by Nathan Muller
- Better Homes & Gardens food, decor
- World Book Encyclopedia
- limited home banking
- Feedback to CompuServe (no charge)
- various contests
- general aviation information

ATARI SUPPORT

CompuServe is going after the ATARI market, and vice versa. ATARI advertises on the back cover of each issue of CompuServe's magazine. There is also an official ATARI department in CompuServe where users can "Talk to ATARI."

The SOURCE, on the other hand, has no official ATARI involvement at this time. But it does have an ATARI section on the bulletin board.

There is no clear best choice for everyone but there could easily be a "wrong" choice for anyone. We hope this analysis will help you get with the one you need.

SMARTMODEM ($279)

This is a direct-connect modem by Hayes Microcomputer, Inc. Although it does not come as a model specifically for the ATARI, you can purchase a cable to connect it to the ATARI 850 Interface (required). The fact that this modem does not come with a cable is a serious drawback in a product that costs so much. This is not a criticism of Hayes alone, as you will discover when you buy your first non-ATARI printer, or other peripheral device.

Assuming you buy the "Hayes Stack," as it is also known, and are able to get or make a cable, you will have the most flexible modem in the price range. This is truly a "smart" modem. The heart of the device is a Z8 microprocessor with a 2K byte control program built in. The only switch is an ON/OFF toggle! Everything else is program controlled, or preset by you, utilizing the configuration panel under the front cover.

Here are some of the features of the SMARTMODEM:

- either touch-tone or pulse dialing at any time;
- audio monitor allows you to hear what your phone line is doing (a status indicator, and a real help when the receiving party is busy);
- storage of the last number dialed;
- automatic redial (helpful for disconnects, busy signals, etc.);
- seven LED status indicators on the front panel (impresses visitors);
- complex dialing sequencing (eg. dial number, wait for tone, send ID, dial another number, as required for MCI and SPRINT);
- programmable in any computer language and compatible with most data communication software.

The list goes on, but the point is made. The Hayes SMARTMODEM is very versatile, but suffers due to a lack of direct applicability to the ATARI. With the appropriate cable (I made my own) and almost any good terminal software, this modem is the most flexible.

There are other usable modems around, though not specifically for the ATARI. They will work fine with the proper cable, and some of the good software.

If you are not in the market for a modem now, I guarantee that you will be some day. It might be a good idea to wait, if you have no immediate urge to link up with the rest of the tribe. Prices keep coming down, and good gear gains reputation as satisfied users swap notes.

Keep your eyes open for new, low cost entrants to this field. For example, I noticed (but have not used) the SIGNALMAN MK-1 from "Anchor Automation" at an unbelievable price of $99, including RS-232 connector cable. This direct connect modem could be the forerunner of a price revolution.

Meanwhile, the modems we have discussed are definitely state-of-the-art products and can be expected to provide good service for a long while.

And so we complete this introduction to the modem, a simple device that opens to you a whole new world of information.

BULLETIN BOARDS

The following telephone numbers can be accessed by anyone with a modem, an ATARI, and the necessary software.

(503) 343-4352—This is sponsored by ACE, the ATARI user group in Eugene, OR. They are one of the older groups and very active. Software, like CHICKEN, is often available for downloading. They are not yet a 24 hour service. If the phone rings more than once, hang up; they are not on-line.

(202) 276-8342—This is a local call for anyone living in Washington, D.C. and is sponsored by the local ATARI user group. Frank Huband is the author of the system and the SYSOP—System Operator.

(313) 868-2064—This system is available 24 hours per day. It's sponsored by MACE, a large and active group in Michigan. This software will be made available, courtesy of MACE, to user groups through the User Group Support staff (see article page 38).

(415) 493-7691—People's Message Service (PMS) is found in many locations around the country. This number is located in Palo Alto, CA. Call in and goto option O. This will then list about 300 other BBS numbers nationwide.

Many computer stores and clubs operate local systems.

UTILITIES

by Bob Gonsalves



In this installment we'll present some utility definitions that you may easily add to your system. The first set of words can be used in many Forth systems, the second set are designed to access the Atari disk file management system.

SOME QUICKIES

Screen 30 shows some useful extensions to fig-Forth systems. Following /, all characters on a line will be ignored; the text following the / is used for commenting. NOT is used to reverse the logical state of the top stack item and is often used before conditional testing words, such as IF, UNTIL.

Another group of words facilitates operations on bytes in 16-bit word. LSBYTE will leave the least significant byte of the top stack value, while MSBYTE leaves the most significant byte. uses these two operations to reverse the two halves of a 16-bit stack value.

Our final category introduces a new data type. The 'TO' type variable, introduced by Paul Bartholdi in *Forth Dimensions*, improves readability and reliability of Forth programs by reducing the number of @ (fetch) and ! (store) operations that must be included in the source text. If the VAR defined variable is preceded by TO, a stack parameter will be stored in the variable. Otherwise, the variable simply leaves its contents. The following should illustrate:

```
0 VAR temp.cell / our specific instance
20 TO temp.cell / store 20 in the variable
temp.cell . 20 / prints the contents of temp.cell
```

FMS 'n FIELDS

With extensions such as these, we're now ready to suggest some ways of accessing FMS formatted files. As shown in figure 1, both the FMS directory entries and the individual sectors of a FMS file share a similar structure. They both feature range of disk space, with certain bytes or 16-bit words having specific significance.

In the case of a directory entry, locations are used to store the state of the file (open,closed,etc), its length and starting sector, plus the characters that make up its name. These locations are offset from an address DIR.ADDR, which contains the address, within the disk buffers, of the start of the directory entry. The defining word FIELDER will create some words that allow us to access these fields. These access words are structured like the TO variables mentioned above. Thus, START.SECTOR for example, will normally leave the starting sector number of a file on the stack. If it is preceded by TO, however, as in:

```
3 TO START.SECTOR
```

then a value is stored to the START.SECTOR field. (This doesn't work as well for FLAG.BYTE, which is only a single byte location.)

Three additional words on screen 32 show ways to make use of the data from these fields. ?NULLED examines the least significant byte of the FLAG.BYTE of a directory entry, and leaves a true flag on the stack if the directory entry is **not** an active one. PNAME will print the name of an entry. BUMPSEC will print out the number of sectors used by an individual file, and increments a counter containing the number of sectors used on the disk.

Our DIR example makes use of all of the above definitions to print out the directory of a FMS disk. It does so by examining sectors 361 through 368 for valid directory entries. Each entry is 16 bytes long (8 per sector) and is checked to see if it is null. If it isn't, its name is printed and the file length is added to the running total (#SEC). At the end of the directory listing, the total number of sectors used by the files is printed, as well as the number of sectors available (according to the FMS Volume Table of Contents), using .USED.

In the case of an actual data sector from a file, the words FILE, POINTER and BCOUNT (all defined by DATA) return the values stored at the end of a data sector. Because of various tricks that are performed (to save disk space) additional words are required to convert the values into a useable format. The word #FILE returns the position of the file in the directory. The next sector number in the file is returned by #POINT, which equals 0 if this sector is the end of the file. #BYTES returns the number of data bytes in the sector, which may range from 125 to 1.

Two other words are useful in this context. DATA.FIELD leaves the address, *in the disk buffers*, of the start of the sector. ?LAST leaves a false flag, plus the next sector number of the file, if the end of the file has not been reached. Otherwise a true flag is left on the stack.

Our final example, on screen 36, illustrates what it might take to list a file. Assuming that the value of

DIR.ADDR has been set to point to the directory entry in the disk buffers, PRINT.FILE starts at the first sector of the file, and types #BYTES from the DATA.FIELD of the sector, until the last sector is reached.

FOR MORE INFO

Because of space limitations, we'll skip over exactly how one locates a specific directory entry. This could be done by simply DUMPing the contents of a disk block, or by actually accepting text from a user and performing a string match against the FMS directory. Other applications for this system, such as loading character fonts into memory and repairing 'damaged' files, can be obtained by writing to the author
c/o Pink Noise Studios
P.O. Box 785
Crockett, CA 94525.
Please include a self-addressed, stamped envelope.

```
 pink noise studios/fig-forth  1/82
\ 30 extensions for others    rfg20apr82
: \ in @ c/l / 1+ c/l * in ! ;
 immediate \ from Henry Laxen
: NOT 0= ;
 hex
: MSBYTE 0 100 u/ swap drop ;
: LSBYTE ff and ;
: >< \ byteswap
  dup lsbyte 100 * swap msbyte + ;
0 variable TOFLAG
: TO 1 toflag ! ;
: VAR <builds ,
      does> toflag @
  if ! else @ then 0 toflag ! ;
 decimal ;s
```

```
\ 31 fields in directory     rfg18apr82
0 variable DIR.ADDR
\ points to directory entry in buffers
: FIELDER <builds c, \ offset into field
 does> c@ dir.addr @ + \ compute addr
 toflag @ if ! else @ then 0 toflag ! ;
0 fielder FLAG.BYTE
1 fielder SECTOR.COUNT
3 fielder START.SECTOR
: NAME.FIELD dir.addr @ 5 + ;
;s
```

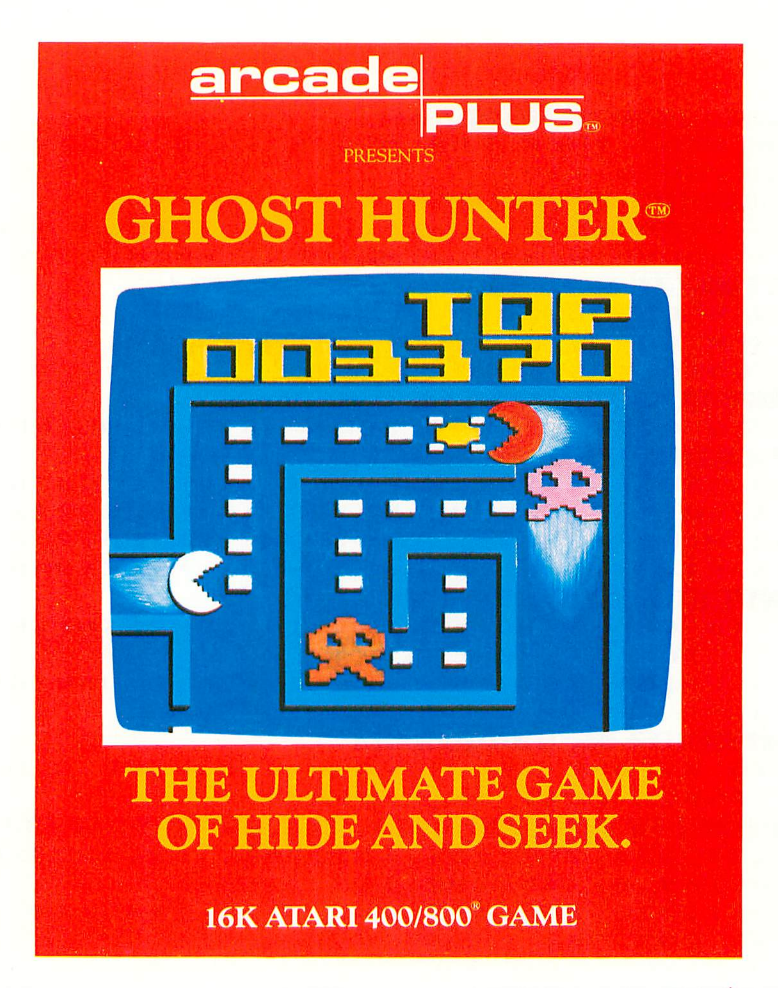
```
\ 32 utilities for DIR       rfg18apr82
: ?NULLED \ return true if nulled out
 flag.byte lsbyte dup 80 =
 swap 0= or sector.count 0= or ;
 hex
: PNAME
 name.field dup 8 type 2e emit
           8 + 3 type ;
0 variable #SEC
: BUMPSEC \ increment total and print
 sector.count dup #sec +! 4 .r ;
 decimal
: .USED \ according to VTOC
  359 block 3 + @ 4 .r
  ."  sectors available " cr ;
;s
```

```
 pink noise studios/fig-forth  1/82
\ 33 directory of FMS disks  rfg18apr82
 decimal
: DIR 0 #sec ! cr
 368 360 \ directory sectors
 do i block dup b/buf + swap
   do i dir.addr !
    ?nulled not
    if pname bumpsec cr then
  16 +loop
 loop cr #sec @ 4 .r
 ."  sectors used by files " cr .used ;
;s
```

```
\ 34 fields in sectors       rfg18apr82
 decimal
 0 variable SECTOR
: DATA <builds c,
  does> c@ sector @ 1- block +
toflag @
 if ! else @ then 0 toflag ! ;
125 data FILE
125 data POINTER
127 data BCOUNT
 hex
\ below return values
: #FILE  file lsbyte 4 / ;
: #POINT pointer >< 3ff and ;
: #BYTES bcount 7f and 7d min ;
\ above accounts for short sectors
;s
```

```
\ 35 dos access utilities    rfg18apr82
: DATA.FIELD \ first storage location
  sector @ 1- block ;
: ?LAST #point -dup 0= ;
\ leave true or false + link
\ to next sector
```

```
 pink noise studios/fig-forth  1/82
\ 36 printing a file         rfg20apr82
\ assumes dir.addr points to
\ directory entry in buffers
: PRINT.FILE
  start.sector sector !
 begin data.field #bytes type
  ?last not
 while sector !
 repeat ;
```



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```
115 REM ACCEPT ONLY A 1 2 OR 3
120 IF K<49 OR K>51 THEN FOR ME=15 TO 0 STEP -0.5:SOUND 0,10
2,12,ME:NEXT ME:GOTO 110
130 REM I LOVE SOUND ROUTINES
135 FOR J=1 TO 7:POKE 710,J*16:FOR X=2 TO 0 STEP -1:FOR ME=1
4 TO 0 STEP -2:SOUND 0,X+J,2,ME:NEXT ME:NEXT X:NEXT J
145 REM EXECUTE SELECTED MOVEIT ROUTINE
150 IF K=51 THEN GOSUB 20:GOTO 175
155 IF K=50 THEN GOSUB 190:GOTO 175
160 GOSUB 210:GOTO 175
170 REM DING...ALL DONE...START OVER
175 FOR ME=15 TO 0 STEP -0.2:SOUND 0,0,2,ME:NEXT ME:RUN
185 REM VERY FAST SUBROUTINE WITH SOUND
190 FOR M=0 TO 255:Z$(19,19)=CHR$(M):POKE 53761,168:POKE 537
63,168:POKE 53760,255-M:POKE 53768,13:POKE 712,M
195 POKE 53762,M:POKE 53762,M/8:POKE 53768,2:Z=USR(ADR(Z$),S
M,960):POKE 53761,0:POKE 53763,0:NEXT M:RETURN
205 REM FAST SUBROUTINE WITH SOUND
210 FOR M=255 TO 0 STEP -1:Z$(19,19)=CHR$(M):POKE 53760,M:FO
R V=175 TO 160 STEP -1:POKE 53761,V
215 POKE 53768,V-160:NEXT V:POKE 712,M:Z=USR(ADR(Z$),SM,960)
:NEXT M:RETURN
225 REM BLINK & BUZZ SUBROUTINE
230 FOR JW=0 TO 8:POKE 755,1:POKE C,0:POKE C,8:NEXT JW:FOR J
W=0 TO 8:POKE 755,2:NEXT JW:RETURN
240 REM DATA TO CREATE Z$ ASSEMBLER SUBROUTINE
250 DATA 104,104,133,204,104,133,203,104,133,206,104,133,205
,166,206,160,0,169,0,145,203,136
260 DATA 208,251,230,204,202,48,6,208,244,164,205,208,240,19
8,204,160,0,145,203,96
```

Reviewed by Robert K. Kawaratani

PICTURE THIS!

by David D. Thornburg
Published by Addison-Wesley Publishing Co.
191 pages—$14.95

Picture This! is the tutorial introduction to Turtle Graphics that Atari should have included with its Pilot package. This should not be taken as a criticism of the documentation that is included with Pilot,which is excellent. *Picture This!* is simply one of the best tutorial packages written for the beginner that I have had the pleasure of reading. The mathematical and the string handling commands are covered in this book only as they are relevant to graphics. The sound command is not covered at all,which may be a disappointment to some, but is appropriate because this is a book on the use of Turtle Graphics. Those topics appropriate to growth as a "Friend of the Turtle" are covered. The other capabilities of Pilot with the exception of the interface to machine language are adequately covered in Student Pilot and Pilot Primer.

David Thornburg leads the reader on a gentle tour of the capabilities of Atari Pilot Turtle Graphics. The tour begins with an indepth lesson entitled "Let's Draw a Square" where the Gr: (Graphics), TURN, and DRAW commands are introduced. Subsequent chapters explore the use of the J: (Jump), REN: (Renumber), T: (Type), A: (Accept), U: (Use), New, VNEW, PA:(Pause), and C: (Compute) commands as they are relevant to the use of the graphics capability of Pilot.

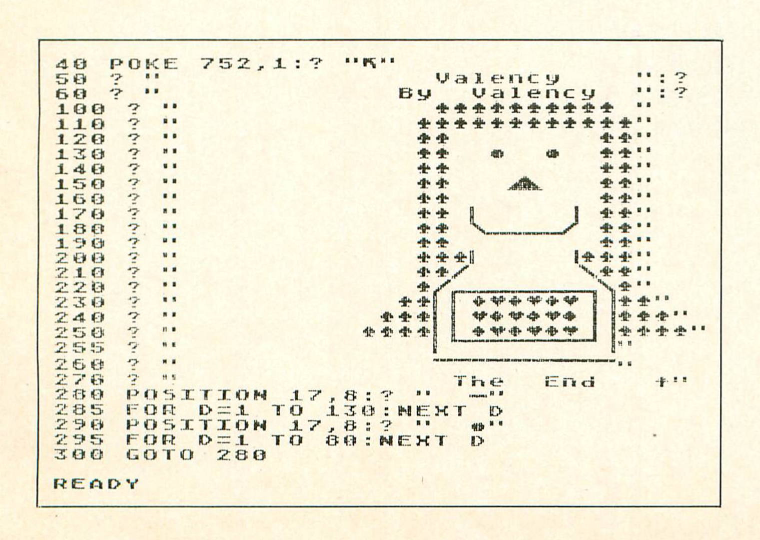
As part of the hands-on approach used throughout the book, the author allows the user to make a variety of mistakes as drawing lines that are too long or nesting modules too deeply. He then guides the user through corrections for the mistakes or explains why an error message has been provided.

One of the great strengths of Pilot as a programming language is the modularity of the language. The beginner learns a more structured approach to programming than with Basic. Thornburg provides a strong introduction to the use of modules in Pilot programming. One demonstration that he provides of the power of modules in Pilot is a simple example of animation.

The book is spiral bound for convenience in use with the computer (after all this is a learn by doing book). All of the modules used in the book are conveniently listed in an appendix. The index is well organized and clearly differentiates between commands, modules, and other topics.

Picture This! is really a necessity for the beginning Pilot user. It will quickly introduce all the essentials for using the Turtle Graphics capabilities of Pilot. Although an experienced ATARI user would probably be able to learn the essentials of Pilot from Student Pilot, *Picture This!* provides a more systematic approach to learning how to use the powerful Turtle Graphics capabilities of Atari Pilot than the documentation provided by Atari.

KIDS KORNER



```
40 POKE 752,1:? "K"
50 ? "                    Valency      ":?
60 ? "                 By   Valency    ":?
100 ? "                  ♣♣♣♣♣♣♣♣♣♣   "
110 ? "                ♣♣♣♣♣♣♣♣♣♣♣♣"
120 ? "                ♣♣          ♣♣"
130 ? "                ♣♣   ●   ●  ♣♣"
140 ? "                ♣♣          ♣♣"
150 ? "                ♣♣     ▲    ♣♣"
160 ? "                ♣♣          ♣♣"
170 ? "                ♣♣          ♣♣"
180 ? "                ♣♣          ♣♣"
190 ? "                ♣♣          ♣♣"
200 ? "                ♣♣♣        ♣♣♣"
210 ? "                ♣♣          ♣♣"
220 ? "                ♣           ♣"
230 ? "              ♣♣  ♣♥♣♥♣♥   ♣♣"
240 ? "            ♣♣♣   ♥♣♥♣♥♣   ♣♣♣"
250 ? "          ♣♣♣♣   ♣♥♣♥♣♥   ♣♣♣♣"
255 ? "                              "
260 ? "                              "
276 ? "                 The   End     +"
280 POSITION 17,8:? "  —"
285 FOR D=1 TO 130:NEXT D
290 POSITION 17,8:? "  ●"
295 FOR D=1 TO 80:NEXT D
300 GOTO 280

READY
```

Dear Kid's Corner:

Here is a fun program. It draws a picture of me and winks at you.

Line 40 is special because the "poke 752,1" turns off the cursor. You type the curvey arrow by hitting ESC and then shift and clear together. It clears the screen.

Hope that you enjoy my picture!!

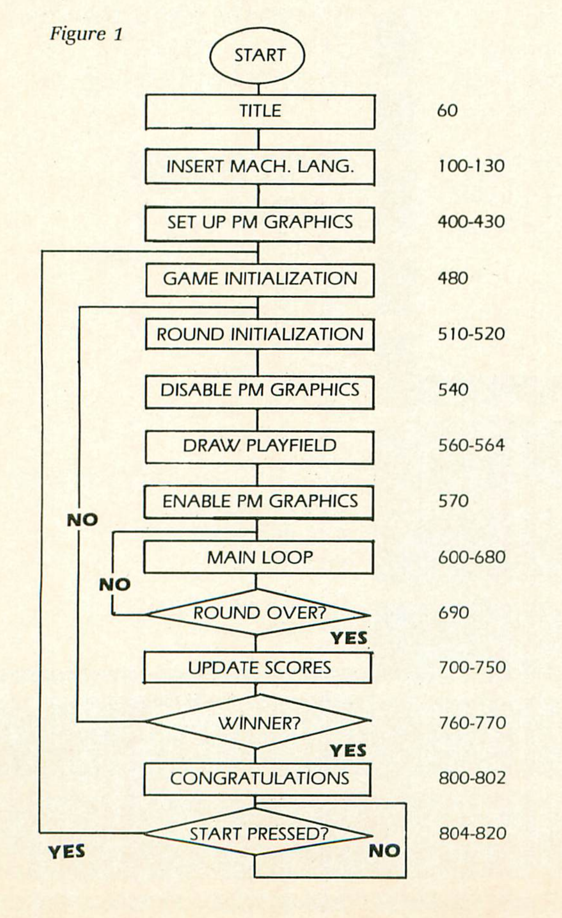
Valency A. Harms
Age 10
Danville, CA

Type this program exactly as shown, including all spaces and special graphics characters. Look at the back cover of your BASIC Reference Manual for the special graphics character keys.—ANTIC ED

```
10 REM ***************************
20 REM ** CRASH-TINKLE-TINKLE **
30 REM **  STAN OCKERS 4-82   **
40 REM ***************************
50 REM
60 GRAPHICS 18:POSITION 0,6:? #6;"CRasH-TinKLE-tInKLe"
100 REM ** VBI ROUTINE **
110 FOR I=1536 TO 1572:READ A:POKE I,A:NEXT I
120 DATA 104,160,10,162,6,169,7,76,92,228,169,0,197,208,240,7,230,206,166,206,142,0,208
130 DATA 197,209,240,7,198,207,166,207,142,1,208,76,98,228
400 REM ** PM GRAPHICS **
410 A=PEEK(106)-16:POKE 54279,A:PM=256*A:FOR I=PM+1024 TO PM+1536:POKE I,0:NEXT I
420 FOR I=1 TO 12:READ A:POKE PM+1100+I,A:POKE PM+1428+I,A:NEXT I
430 DATA 60,126,126,189,219,219,219,219,189,126,126,60
450 REM ** START VBI **
460 A=USR(1536)
470 REM ** INIT. FOR GAME **
480 WINDOW1=176:WINDOW2=72:START1=46:START2=202:VANISH1=80:VANISH2=160:SCORE1=0:SCORE2=0:MAXSCORE=1000
500 REM ** INIT. FOR ROUND **
510 POKE 206,START1:POKE 207,START2:POKE 208,0:POKE 209,0:GO1=0:GO2=0:CRASH1=0:CRASH2=0:POKE 704,200:POKE 705,216
520 POKE 53248,START1:POKE 53249,START2:R1=RND(0)*50+20:R2=RND(0)*50+20
530 REM ** DISABLE PM GR. **
540 POKE 53277,0:FOR I=53261 TO 53264:POKE I,0:NEXT I
550 REM ** CLEAR SCREEN-ARRANGE TEXT AREA **
560 GRAPHICS 3:A=PEEK(560)+256*PEEK(561)
561 IF PEEK(A)<>66 THEN A=A+1:GOTO 561
562 POKE A,71:POKE A+3,6:POKE A+4,6:POKE A+5,65:POKE A+6,PEEK(A+7):POKE A+7,PEEK(A+8)
564 POKE 656,0:POKE 657,23:? "PLYR #1 PLYR #2":POKE 656,0:POKE 657,6:? SCORE1:POKE 656,0:POKE 657,13:? SCORE2
569 REM ** ENABLE PM GR. **
570 POKE 559,62:POKE 53277,3
580 COLOR 1:PLOT 34,2:DRAWTO 34,9:COLOR 2:PLOT 5,11:DRAWTO 5,18
600 REM ** MAIN LOOP **
610 R1=R1-1:IF GO1=0 AND R1<0 THEN POKE 208,1:GO1=1
620 R2=R2-1:IF GO2=0 AND R2<0 THEN POKE 209,1:GO2=1
625 XPOS1=PEEK(206):XPOS2=PEEK(207):MOVE1=PEEK(208):MOVE2=PEEK(209)
627 IF MOVE1=1 THEN SOUND 0,XPOS1,10,8
628 IF MOVE2=1 THEN SOUND 1,250-XPOS2,10,8
630 IF XPOS1>VANISH1 AND MOVE1=1 THEN POKE 704,0
640 IF XPOS2<VANISH2 AND MOVE2=1 THEN POKE 705,0
650 IF XPOS1>WINDOW1 AND CRASH1=0 THEN POKE 208,0:GOSUB 1000:CRASH1=1
660 IF XPOS2<WINDOW2 AND CRASH2=0 THEN POKE 209,0:GOSUB 1500:CRASH2=1
670 IF STRIG(0)=0 AND MOVE1=1 THEN POKE 208,0:POKE 704,200:SOUND 0,0,0,0
680 IF STRIG(1)=0 AND MOVE2=1 THEN POKE 209,0:POKE 705,216:SOUND 1,0,0,0
690 IF MOVE1=1 OR MOVE2=1 OR GO1=0 OR GO2=0 THEN 610
700 REM ** SCORING **
710 S1=0:S2=0:IF CRASH1=0 THEN S1=PEEK(206)-START1
720 IF CRASH2=0 THEN S2=START2-PEEK(207)
725 POKE 656,1:POKE 657,6:? S1:POKE 656,1:POKE 657,13:? S2
730 IF S2>S1 THEN S1=0:GOSUB 2000
740 IF S1>S2 THEN S2=0:GOSUB 2100
750 SCORE1=SCORE1+S1:SCORE2=SCORE2+S2
760 IF SCORE1>=MAXSCORE THEN W=1:GOTO 790
762 IF SCORE2>=MAXSCORE THEN W=2:GOTO 790
770 POKE 77,0:FOR I=1 TO 500:NEXT I:GOTO 510
790 REM ** END OF GAME **
795 POKE 656,0:POKE 657,6:? SCORE1:POKE 656,0:POKE 657,13:? SCORE2
```

```
800 POKE 656,1:POKE 657,5:? "PLYR #";W;" WINS!!":FOR I=1 TO 100:X=RND(0)*39:Y=RND(0)*19:COLOR RND(0)*4:PLOT X,Y
802 SOUND 0,X*3+Y*4,10,10:FOR J=1 TO 10:NEXT J:NEXT I:SOUND 0,0,0,0
804 POKE 656,1:POKE 657,5:? "PRESS START     "
810 IF PEEK(53279)<>6 THEN 810
820 GOTO 480
990 REM ** CRASH SUBROUTINES **
1000 SAV=PEEK(209):POKE 209,0:SOUND 1,0,0,0:COLOR 0:PLOT 34,2:DRAWTO 34,9
1010 COLOR 1:FOR I=1 TO 6:X=RND(0)*3+32:Y=RND(0)*7+2:PLOT X,Y
1020 SOUND 0,80-RND(0)*50,2,12-2*I:NEXT I
1030 COLOR 0:FOR X=32 TO 35:FOR Y=2 TO 9:PLOT X,Y:NEXT Y:NEXT X
1040 RESTORE 1045:COLOR 1:FOR I=1 TO 6:READ X,Y:PLOT X,Y:SOUND 0,10+RND(0)*30,10,10:NEXT I:SOUND 0,0,0,0
1045 DATA 32,9,33,9,33,8,34,7,34,8,35,9
1050 POKE 209,SAV:RETURN
1500 SAV=PEEK(208):POKE 208,0:SOUND 0,0,0,0:COLOR 0:PLOT 5,11:DRAWTO 5,18
1510 COLOR 1:FOR I=1 TO 6:X=RND(0)*3+3:Y=RND(0)*7+11:PLOT X,Y
1520 SOUND 1,80-RND(0)*50,2,12-2*I:NEXT I
1530 COLOR 0:FOR X=2 TO 6:FOR Y=11 TO 18:PLOT X,Y:NEXT Y:NEXT X
1540 RESTORE 1545:COLOR 2:FOR I=1 TO 6:READ X,Y:PLOT X,Y:SOUND 1,10+RND(0)*30,10,10:NEXT I:SOUND 1,0,0,0
1545 DATA 4,18,5,18,5,17,6,18,5,16,6,17
1550 POKE 208,SAV:RETURN
1990 REM ** SCORING SUBROUTINES **
2000 FOR I=1 TO 6:POKE 656,1:POKE 657,13:? "      ":SOUND 0,60,10,10:FOR J=1 TO 30:NEXT J:POKE 656,1:POKE 657,13
2010 ? S2:SOUND 0,0,0,0:FOR J=1 TO 30:NEXT J:NEXT I:POKE 656,1:POKE 657,6:? "0    ":RETURN
2100 FOR I=1 TO 6:POKE 656,1:POKE 657,6:? "      ":SOUND 1,90,10,10:FOR J=1 TO 30:NEXT J:POKE 656,1:POKE 657,6
2110 ? S1:SOUND 1,0,0,0:FOR J=1 TO 30:NEXT J:NEXT I:POKE 656,1:POKE 657,13:? "0    ":RETURN
```

Figure 1




```
01 ;
10 ; Listing #2
20 ; by Stan Ockers
30 ; for ANTIC The ATARI Resource
40 ; a Vertical Blank Interrupt routine
50 ; call from BASIC A=USR(1536)
60 ;
70           *=   $600      ; page six location
80           PLA            ; ignore parameter count
90           LDY  #$0A      ; lo-byte VBI routine
0100         LDX  #$06      ; hi-byte VBI rout.
0110         LDA  #07       ; deferred VBI
0120         JMP  $E45C     ; O.S. inserts VBI
0130 VBI     LDA  #00       ; zero ?
0140         CMP  $D0       ; move flag plyr 0
0150         BEQ  SKP       ; forget plyr 0
0160         INC  $CE       ; one space right
0170         LDX  $CE       ; update
0180         STX  $D000     ; horiz pos. plyr 0
0190 SKP     CMP  $D1       ; mov flag 1 0 ?
0200         BEQ  OUT       ; yes forget plyr 1
0210         DEC  $CF       ; one space left
0220         LDX  $CF       ; update
0230         STX  $D001     ; horiz pos. plyr 1
0240 OUT     JMP  $E462     ; VBI exit thru O.S.
```

PUBLIC DOMAIN SOFTWARE EXCHANGE

ANTIC welcomes David Duberman to our staff. Dave will serve as software librarian. It will be Dave's job to contact every user group and arrange to exchange public domain software. Our goal is to collect and collate all the public domain software currently available for the ATARI. As we accomplish this task, we will make this software available to our readers as cheaply as possible. We will categorize this software and write a short description of each program. Suggested categories are: utilities, games, music, assembly language routines, business, Forth, education, and Pilot.

For those clubs that would like to exchange disks with us, contact Dave at:

ANTIC Publishing
297 Missouri Street
San Francisco, CA 94107

Dave has already begun this rather extensive task, if you would like to take part in this let him know.

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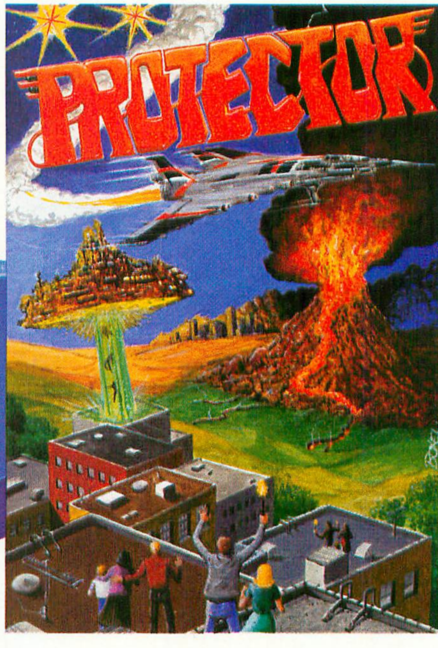
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THEY LAUGHED AT ME WHEN I SAT DOWN AT THE KEYBOARD . . .
BUT OH, WHEN I BEGAN TO PLAY! ***HERE'S WHAT THEY SAID:***



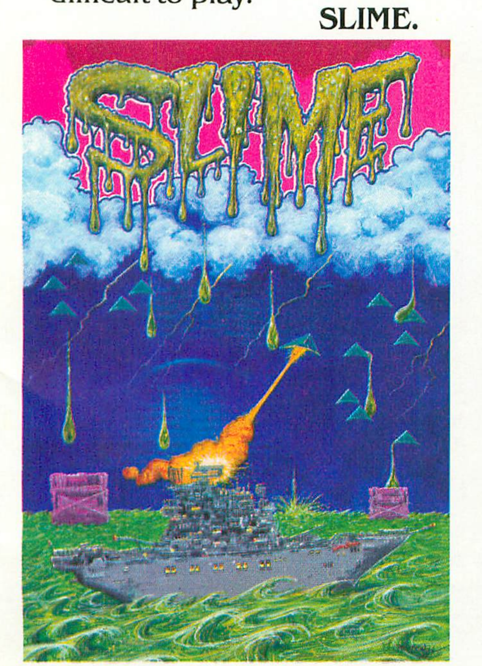
BPL-ATON I—"I've had to replace three electro-universal wristcouplers since I got it."

PROTECTOR.



CORGUS I—"Even with a class II embryonic neurolifter, it is disgustingly difficult to play."

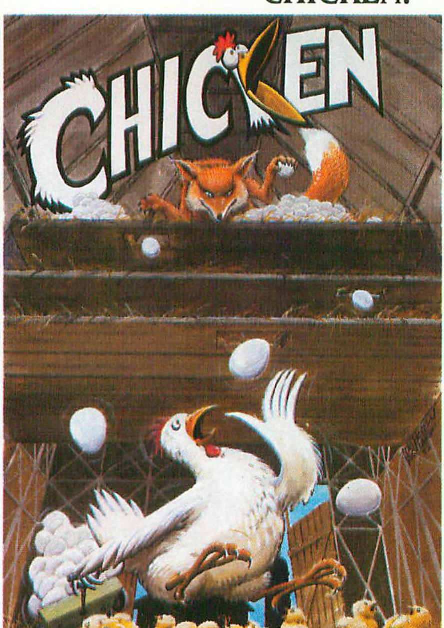
SLIME.





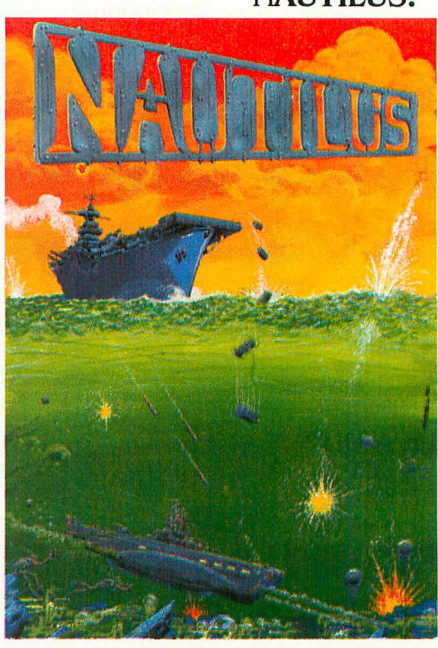
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